Regional Natural Hazard Mitigation Plan

Prepared by:
Thomas Jefferson
Planning District Commission

tjpdc.org

Thomas Jefferson Planning District Commission
Regional Hazard Mitigation Plan
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Executive Summary

Overview

The Federal Disaster Mitigation Act of 2000 requires all localities to develop and adopt a hazard mitigation plan or participate in a regional plan in order to continue to be eligible for funding through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program and Pre-Disaster Mitigation Grant Program. This Regional Natural Hazard Mitigation Plan is a multi-jurisdictional plan that enables the localities of the Thomas Jefferson Planning District Commission (TJPDC) –Albemarle County, Fluvanna County, Greene County, Louisa County, Nelson County, the City of Charlottesville, and the Towns of Scottsville, Columbia, Stanardsville, Louisa, and Mineral – to meet this requirement. The plan addresses natural hazards such as flooding, winter storms, and wildfires. It is neither intended nor required to address non-natural disasters, such as terrorism, chemical spills, or similar events.

The lead agency in the preparation of this plan is the Thomas Jefferson Planning District Commission. The Hazard Mitigation Staff Team consisted of staff members at the TJPDC. A Working Group consisting of representatives from the planning department and emergency management department or Administration from each locality guided the preparation of this plan. The larger Advisory Committee included all members of the Working Group, plus additional locality representatives, representatives from state agencies (VDOT, VDOF, VDEM), public and private organizations, representatives from the University of Virginia, and members of the public. The Advisory Committee reviewed the plan at various stages of development and provided input into the process.

An initial meeting of the Advisory Committee was held on February 26, 2004. Two other workshops were held on May 4, 2004 and December 8, 2004. Data collections worksheets were developed and distributed to all of the localities, and an interactive survey regarding hazards and mitigation planning was placed online for citizen input. Additionally, work sessions were held with each locality's Local Emergency Planning Committee to refine a comprehensive list of potential mitigation actions specific to each locality.

Participating localities approved the plan for submission to FEMA between May and July of 2005. Following final approval by FEMA and formal adoption by all localities, the plan will be reviewed annually, and updated on a five-year cycle.

The purpose of this Plan is:

1. To protect life, safety, and property by reducing the potential for future damages and economic losses that result from natural hazards;
2. To meet the requirements of the Disaster Mitigation Act of 2000, and therefore qualify for additional grant funding in both the pre-disaster and post-disaster environment;

3. To speed recovery and redevelopment following future disaster events;
4. To demonstrate a firm local commitment to hazard mitigation and sustainability principles;
5. To comply with both state and federal legislative requirements for local hazard mitigation plans.

Identifying and Prioritizing Hazards

This plan includes descriptions of the history and impacts of any hazards with some likelihood to affect the region, as well as past disaster declarations. In order to prioritize future mitigation efforts, the Working Group evaluated all hazards for frequency of occurrence, magnitude of personal and property damages and interruption of services, and ability to mitigate each type of hazard. As shown in the chart below, the hazards of highest risk to the region are flooding, winter storms, and hurricanes. Hazards of moderate risk are tornadoes, high wind events, and drought. Landslides, earthquakes, wildfire, dam failure, extreme heat, lightning and extreme cold pose a minimal relative threat to the region.

HAZARDS ASSESSMENT TOOL					
EVENT	**PROBABILITY**	**HUMAN IMPACT**	**PROPERTY IMPACT**	**BUSINESS IMPACT**	**RISK**
	Likelihood this will occur	***Possibility of death or injury***	***Physical losses and damages***	***Interruption of services***	***Relative threat****
SCORE	***0 = N/A 1 = Low 2 = Low-Mod 3 = Moderate 4= Hi-Mod 5=High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 - 100%***
Flooding	5	3	3	2	89%
Blizzards/Icestorms/Winter Storms	5	2	1	2	56%
Hurricanes	3	2	2	2	40%
Tornadoes	2	2	2	2	27%
High Wind / Windstorms	3	2	1	1	27%
Drought	3	0	2	2	27%
Landslides	3	1	1	1	20%
Earthquake	3	1	1	1	20%
Wildfire	2	1	2	1	18%
Dam Failure	1	3	3	2	18%
Extreme Heat	2	2	0	1	13%
Lightning	4	0	1	0	9%
Extreme Cold	1	2	0	1	7%
AVERAGE SCORE	2.64	1.50	1.36	1.29	
		RISK = PROBABILITY * SEVERITY			
		0.24	**0.53**	**0.46**	

Vulnerability Assessment

In addition to the work of the Hazard Mitigation staff team of the Thomas Jefferson Planning District Commission, this plan was developed with the input and assistance of many dedicated people, representing a variety of localities and agencies and the general public. They include members of the Hazard Mitigation Working Group, the Advisory Committee, staff of participating localities, Local Emergency Planning Committees, Virginia Department of Emergency Management, students of PLAC 513 (a University of Virginia graduate planning class led by Dr. David Phillips), and private citizens who attended the meetings and responded to an online survey. This plan also benefited from the work of other localities – much of the format is based on hazard mitigation plans developed by the New River Valley Planning District Commission, the City of Chesapeake, Virginia, and the State of Delaware.

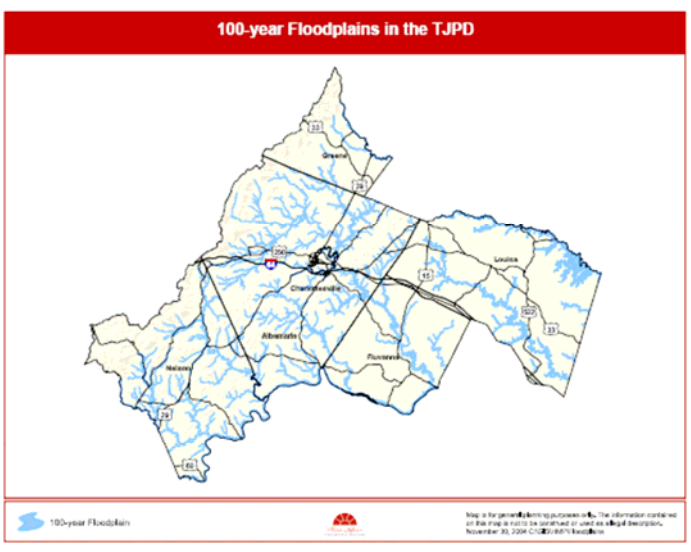
Using Federal, State and local data, areas of high hazard risk are identified such as high water roads and structures located in hazardous areas. Populations residing in a high risk zone are also identified. Using best available data as required by FEMA, the hazard mitigation team located structures and estimated values for all buildings appearing to be located within either the 100-year floodplains or high wildfire risk areas (see figures below). This analysis included current and proposed buildings. Maps are located throughout the plan.

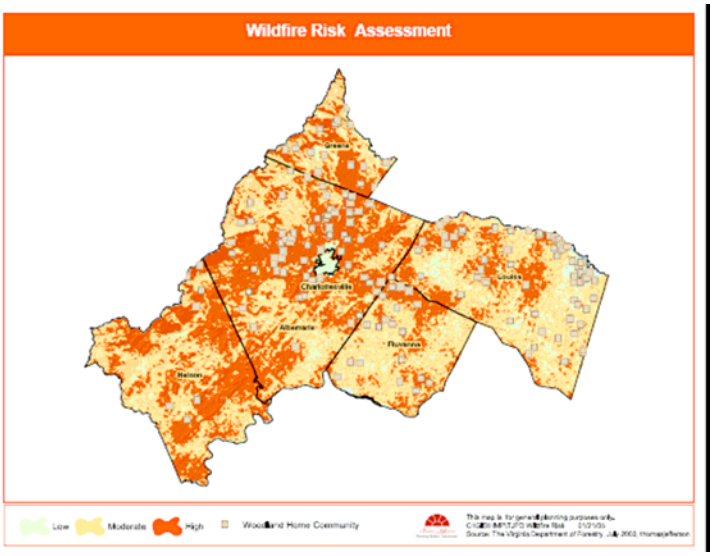
Inventory Assets: Total PDC
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	72,008	1,342	1.86%	$11,055,422,000	$154,127,268	1.394%	199,648	3,225	1.62%
Non-Residential	872	163		$1,970,887,000	$35,854,510				
Commercial		45		$1,437,855,000	$26,825,910				
Industrial		0		$218,940,000	undetermined				
Agricultural		93		$33,461,000	$7,806,700				
Religious/Non-profit		8		$106,736,000	$98,600				
Government		3		$21,784,000	undetermined				
Education		0		$152,111,000	undetermined				
Utilities		14			$1,123,300				
Total	72,880	1505	2.07%	$23,584,722,384	$189,981,778	0.81%	199,648	3,225	1.62%

Inventory Assets: Total PDC
Hazard: Wildfire

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	61732	6106	9.89%	$11,474,354,100	$2,125,326,990	18.52%	159549	15434	9.67%





Current and planned critical facilities were also mapped and their building values identified. FEMA defines critical facilities as "facilities that are critical to the health and welfare of the population and that are especially important following hazard events." For the purposes of this plan, the TJPDC has defined critical facilities as follows:

Emergency Facilities: should be operational directly following a disaster:

a. Hospitals/medical clinics
b. Police stations
c. Fire stations
d. Emergency operations centers
e. Shelters

Essential Infrastructure: necessary to retain operational status of community; to be restored as quickly as possible following a disaster:

a. Transportation systems—includes roads, bridges, rail, airways
b. Potable water systems
c. Wastewater systems
d. Power—including lines, buildings, substations
e. Communication systems—includes towers and lines
f. Oil and Natural gas lines

Mitigation Strategy

The mission statement of the TJPDC Regional Natural Hazard Mitigation Plan is:

> **To protect local residents, property, businesses, and the natural environment from damage by implementing long-term goals to reduce the impacts of natural hazards.**

The goals and objectives of the mitigation strategy—which include actions or policy taken to reduce loss of life and property—follow:

GOAL: Through education and training, increase awareness of hazards and potential mitigation strategies.

OBJECTIVE: Educate citizens on techniques for disaster preparedness.

OBJECTIVE: Educate and train key agency staff on disaster mitigation and preparedness, with an emphasis on emergency respondents, building inspectors and code officials.

OBJECTIVE: Develop hazard mitigation educational materials and a process for disseminating information to citizens, local and regional staff and agencies.

OBJECTIVE: Identify outreach methods to reach a large percentage of the population.

GOAL: Build capacity with information and data development to refine hazard identification and assessment, mitigation targeting and funding identification.

OBJECTIVE: Identify data and information needs and develop methods to meet these needs.

OBJECTIVE: Ensure that critical facilities meet disaster preparedness requirements.

OBJECTIVE: Plan for long-term needs to adequately address future conditions that may exacerbate identified hazards.

GOAL: Incorporate Sustainability Accords and mitigation concepts into existing and future policies and plans.

OBJECTIVE: Incorporate mitigation planning concepts into zoning, ordinances and building codes.

OBJECTIVE: Establish or revise policies to ensure that critical facilities and emergency shelters are operational during and after natural disasters.

OBJECTIVE: Link community planning and mitigation planning together to achieve common community goals.

GOAL: Pursue funding to implement identified mitigation strategies.

OBJECTIVE: Identify appropriate funding sources.

OBJECTIVE: Create or strengthen partnerships to develop integrated grant proposals and coordinated implementation plans.

OBJECTIVE: Increase staffing to implement mitigation strategies.

GOAL: Identify and implement physical projects that will directly reduce impacts from hazards.

OBJECTIVE: Elevate, retrofit and relocate existing structures and facilities in vulnerable locations.

OBJECTIVE: Install devices and signage to improve communication and warning systems, ensure operations of emergency shelters, and reduce response time in the event of a natural hazard.

OBJECTIVE: Provide buffers in sensitive areas to protect lives and property.

The TJPDC employed a variety of methods which included research, interviews, questionnaires, surveys and meetings to compile an exhaustive list of mitigation actions which were distributed to each locality. After meeting with each LEPC and the Working Group, individual mitigation actions were selected and prioritized specific to each locality. Priorities of mitigation actions were assigned based on:

-the magnitude of risk*severity of the hazard being mitigated;
-the capability of each locality to complete the actions;
-the cost of the mitigation actions; and
-the timeframe in which projects are more likely to be carried out.

A summary table of the mitigation strategy follows. Mitigation actions are numbered XYZ#, where X denotes locality (Regional, Albemarle, Albemarle – Town of Scottsville, Charlottesville, Fluvanna, Fluvanna – Town of Columbia, Louisa, Louisa – Town of Louisa, Louisa – Town of Mineral, Greene, Greene – Town of Stanardsville, and Nelson), Y denotes priority (Low, Moderate, High) and Z denotes type of mitigation action (Structural; Education and Outreach; Policy, Planning and Funding; Information and Data Development), with projects numbered sequentially within categories.

Regional Project List		
Number	Action	Implementation Schedule
RHP1	Write Regional Green Infrastructure Plan	1-2 years
RHI1	Create an Interactive Map Server and Database	1-2 years
RHE1	Create a hazards library and information toolkit	1-3 years
RHP2	Complete the Regional Water Supply Plan	1-2 years
AHE1	Provide a telephone number or website that gives useful information following a disaster	1-2 years
AHE2	Place hazard mitigation plan in local libraries and on locality websites	Upon plan approval
AHE3	Create educational campaign about the benefits of open space protection	Ongoing
AHE4	Provide educational information about the burn permit process	Ongoing
AHE 5	Add emergency preparedness and response information in local phone books	1-2 years
AHI1	Conduct study of resistance of critical facilities to natural hazards	1-3 years
AHI2	Complete water supply study	1 year
AHI3	Coordinate with Fluvanna County on emergency plan for failure of South Fork Rivanna Reservoir Dam	1 year
AHP1	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
AHP2	Incorporate hazard mitigation plan into community plans	1-2 years
AHP3	Conduct Community Emergency Response Team (CERT) classes	Ongoing
AHP4	Increase number of trained emergency responders	As increased population warrants
AHP5	Support tree maintenance program	Ongoing
AHP6	Implement recommendations of water supply study	50 years
AHS1	Ensure that all shelters and public buildings have a battery-powered emergency radio and flashlight	1 year
AHS2	Conduct phase I improvement to Ragged Mountain Reservoir Dam--Add larger spillway and additional concrete reinforcement to spillway	1-5 years
AHS3	Conduct structural evaluations of all current and proposed shelters	1-3 years
AME1	Encourage water conservation	Ongoing
AME2	Create a public education program on disaster preparedness	Ongoing
AME3	Create displays about mitigation actions for use at public events	2-5 years
AME4	Conduct FireWise workshops	2-5 years
AME5	Encourage property owners to clear out dead wood from forests	Ongoing
AMI1	Gather and maintain GIS database on bank restoration needs of Rivanna Reservoir	Ongoing
AMI2	Expand GIS data for use in mitigation planning activities	Ongoing
AMP1	Create Emergency Action Plan for Upper Ragged Mountain Dam	1-3 years
AMP2	Continue to pursue conservation easements in sensitive areas	Ongoing
AMP3	Develop cooperative agreement between all agencies involved in emergency management, provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster, and conduct joint emergency exercises	2-5 years
AMP4	Hire fire code official	2-5 years

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
AMS1	Install backup generators in shelters and critical facilities	As new shelters and critical facilities are built
AMS2	Build or repair bridges so as to not impede floodwaters	When new bridges are built or repaired
AMS3	Upgrade all area bridges to support emergency vehicles	As repairs are made
AMS4	Complete phase II improvements to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline	3-5 years
AMS5	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations	3-5 years
ALE1	Encourage residents and agencies to clear storm drain inlets, ditches, and channels	Ongoing
ALE2	Establish a "Hazard Awareness Week" with local media to educate public about natural hazards	3-5 years
ALE3	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	3-5 years
ALP1	Use recreational trails as fire breaks and access lines	Ongoing
ALP2	Acquire riparian easements in sensitive and/or floodprone areas	3+ years
ALS1	Improve the maintenance of stormwater conveyance systems.	Ongoing
ALS2	Increase capacity of drainage systems and ponds where needed	5+ years
ALS3	Clear creek beds or dredge creeks to remove debris where flooding has increased	5+ years
ALS4	Reduce pollution discharge via stormwater systems	Ongoing
ALS5	Retrofit stormwater management basins	Ongoing
ALS6	Ensure evacuation routes meet proper standards	5+ years
ALS7	Encourage fire breaks in tree farms	Ongoing
ALS8	Install more dry hydrants in high wildfire risk areas	3-5 years
ALS9	Clear ditches of flammable debris	Ongoing
ALS10	Create defensible spaces between Woodland Home Communities and areas of high wildfire risk	5+ years
ALS11	Move shrubs and landscaping away from homes, public buildings, and businesses, and clear dead brush and grass from properties in high wildfire risk areas	Ongoing
ALS12	Maintain and add more fire rings in camping areas for controlled fires	5+ years
ASMP1	Incorporate hazard mitigation plan into community plans	1-5 years
ASLS1	Bury utilities underground in town of Scottsville	1-5 years
CHE1	Provide a telephone number or website that gives useful information following a disaster	1-2 years
CHE2	Place hazard mitigation plan in local libraries and on City website	Upon plan approval
CHE3	Create educational campaign about the benefits of open space and sensitive area protection	Ongoing
CHE 4	Add emergency preparedness and response information in local phone books	1-2 years
CHI1	Complete water supply study	1 year
CHP1	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
CHP2	Incorporate hazard mitigation plan into community plans	1-2 years
CHP3	Conduct Community Emergency Response Team (CERT) classes	Ongoing
CHP5	Implement recommendations of water supply study	50 years
CHP6	Provide rebate to homeowners who purchase low-flow appliances	Ongoing

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
CHP7	Encourage more institutions to use low-flow appliances	Ongoing
CHP8	Continue use of the Reverse E911 System	Ongoing
CHP9	Ensure all large facilities have updated evacuation plans	1-3 years
CHP10	Ensure all large facilities have updated shelter in place plans	1-3 years
CHS1	Ensure that all shelters and public buildings have a battery-powered emergency radio and flashlight	1 year
CHS2	Conduct phase I improvement to Ragged Mountain Reservoir Dam--Add larger spillway and additional concrete reinforcement to spillway	1-5 years
CME1	Encourage water conservation	Ongoing
CME2	Create a public education program on disaster preparedness	Ongoing
CME3	Create displays about mitigation actions for use at public events	2-5 years
CMI1	Gather and maintain GIS database on bank restoration needs of Rivanna Reservoir	Ongoing
CMP1	Create Emergency Action Plan for Upper Ragged Mountain Dam	1-3 years
CMP2	Pursue conservation easements in sensitive areas	Ongoing
CMP3	Develop cooperative agreement between all agencies involved in emergency management and provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster and conduct joint emergency exercises	2-5 years
CMP4	Support volunteer groups and encourage collaboration on public outreach and education programs on hazard mitigation	Ongoing
CMP5	Establish plan for muncipal operations prior to and during drought	1-5 years
CMP6	Require more stringent policy to discourage floodplain development	2-4 years
CMP7	Prevent clear cutting or removal of forested areas to prevent mudslides	Ongoing
CMP8	Support purchase of rain barrels	Ongoing
CMP9	Develop water restriction policy during drought	3-5 years
CMP10	Encourage policy which implements proactive environmental actions to reduce flooding--reduce impervious surfaces, restore wetlands, restore streambanks, add curb extensions to catch leaf debris, etc.	Ongoing
CMP11	Create a media strategy	Ongoing
CMS1	Build or repair bridges so as to not impede floodwaters	When new bridges are built or repaired
CMS2	Upgrade all area bridges to support emergency vehicles	As repairs are made
CMS3	Complete phase II improvements to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline	3-5 years
CMS4	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations	3-5 years
CMS5	Put high water marks on bridges	2-5 years
CMS6	Add signage to roads in locations that frequently flood	2-5 years
CMS7	Retrofit emergency services buildings for hazard resistance	3-5 years
CLE3	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	3-5 years
CLI4	Conduct channel improvement study to investigate flooding problems	3-5 years
CLP2	Join the Community Rating System	3-5 years
CLP3	Support open space preservation in floodplains	Ongoing

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Regional Project List		
Number	Action	Implementation Schedule
CLP4	Hire a floodplain management official and enforce floodplain regulations	3-5 years
CLP5	Encourage homeowners to install back-flow valves to prevent reverse flow	Ongoing
CLP6	Encourage creek and stream storage capacity through daylighting	5+ years
CLP7	Preserve riparian buffers	Ongoing
CLS1	Improve the maintenance of stormwater conveyance systems.	Ongoing
CLS2	Increase capacity of drainage systems and ponds where needed	5+ years
CLS3	Clear creek beds or dredge creeks to remove debris where flooding has increased	5+ years
CLS4	Reduce pollution discharge via stormwater systems	Ongoing
CLS5	Retrofit stormwater management basins	Ongoing
CLS6	Ensure evacuation routes meet proper standards	5+ years
CLS7	Remove abandoned buildings in floodplains	5+ years
CLS8	Bury power, phone, and cable utility lines underground	5+ years
CLS9	Provide citizens with literature about flood and drought-smart landscaping	3-5 years
FHE1	Provide telephone number and website with useful information before and during a disaster	1-3 years
FHI1	Update National Flood Insurance Maps	1-3 years
FHP1	Conduct structural evaluations and study of resistance to hazards of all current and proposed shelters	1-5 years
FHS1	Retrofit emergency services building for hazard resistance	1-5 years
FHS2	Install backup generators in shelters and critical facilities	1-5 years
FMP1	Create a community toolbox with tools and information for local homeowners	3-5 years
FMP2	Develop water restriction policy during drought	Ongoing
FMP3	Incorporate hazard mitigation plans into community plans	1-3 years
FLE 1	Provide educational lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	5+ years
FLE 2	Develop an all-hazard resource center at libraries or other public office	3-5 years
FLL2	Encourage protective stormwater mitigation measures such as flood project, reducing impervious surfaces, stilling and infiltration basins, and restoring wetlands in growth areas	5+ years
FLP1	Increase number of trained emergency responders and conduct CERT workshops	Ongoing
FCHE1	Provide telephone number and website with useful information before and during a disaster	1-3 years
FCMP1	Incorporate hazard mitigation plans into community plans	1-5 years
GHE1	Support volunteer groups and encourage collaboration on public outreach and education	Ongoing
GHE2	Provide training for building officials and code inspectors	1 year
GHE3	Place hazard mitigation plan in local libraries and websites	Upon plan adoption and approval
GHI1	Update FEMA Floodplain maps	1-5 years
GHI2	Conduct structural evaluations of current and proposed shelters	1-3 years
GHP1	Establish Reverse E-911 System	1 year
GHP2	Ensure all critical facilities have updated shelter-in-place plans	1-3 years

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
GHP3	Update driveway codes to allow access for emergency vehicles	1-3 years
GHP4	Routinely inspect fire hydrants	Ongoing
GHS1	Install backup generators in shelters and critical facilities	1-3 years
GME1	Develop all-hazard resource center	2-5 years
GME2	Develop cooperative agreement between all agencies involved in emergency management, provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster, and conduct joint	Ongoing
GMI1	Standardize GIS data for use in mitigation planning	2-5 years
GMI2	Conduct channel improvement study	3-5 years
GMI3	Create needs survey identifying special populations	1-3 years
GMP1	Support open space preservation in floodplain	Ongoing
GMP2	Ensure evacuation routes are upgraded to proper standards	2-5 years
GMP3	Incorporate hazard mitigation plan into community plans	In next comprehensive plan update
GMP4	Preserve riparian buffers	Ongoing
GMP5	Join the Community Rating System	2-5 years
GMP6	Conduct Citizen Emergency Respose Team (CERT) classes	1-3 years
GMP7	Require more stringent policy to discourage floodplain development	In next comprehensive plan, zoning code, and subdivision code update
GMS1	Retrofit emergency services building for hazard resistance	2-5 years
GMS2	Build and repair bridges so as not to impede floodwaters	2-5 years
GLE1	Encourage residents and agencies to clear storm drain inlets, ditches, and channels	Ongoing
GLP1	Investigate safety and maintenance of roads in private communities	3-5 years
GLP2	Ensure primary roads are clear of trees and power lines to the edge of the right of way	5+ years
GLP3	Provide paid fire and rescue staff	3-5 years
GLS1	Increase storage capacity of creeks and streams	5+ years
GLS2	Ensure culverts, streams, channels, storm drains, and gutters remain clear of debris	Ongoing
GLS3	Increase cell phone coverage in rural areas	1-3 years
GLS4	Create defensible space between Woodland Home Communities and areas of high wildfire risk	5+ years
GSMP1	Incorporate hazard mitigation plan into community plans	1-5 years
GSLS1	Bury utilities in Town of Stanardsville and surrounding area	5+ years
LHE1	Encourage water conservation	Ongoing
LHE2	Provide a telephone number or website with useful information	1 year
LHE3	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
LHE4	Place hazard mitigation plan in local libraries and on locality websites	Upon plan approval

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
LHP1	Establish Reverse E911 System in all localities	1-3 years
LHP2	Ensure that all large facilities have updated evacuation plans	1 year
LHP3	Ensure all large facilities have updated shelter in place plans	1 year
LHP4	Conduct Community Emergency Response Team (CERT) classes	Ongoing
LHP5	Increase number of trained emergency responders	Ongoing
LHS1	Install backup generators in shelters and critical facilities	Ongoing
LHS2	Put high water marks on bridges	1-2 years
LHS3	Ensure all shelters and public buildings have a battery-powered emergency radio & flashlight	1-2 years
LHS4	Ensure all houses have properly placed E911 address signs	1-2 years
LMS1	Install more dry hydrants	3-5 years
LME1	Create a public education program on how to be self-sufficient following a disaster and on mobilization	2-5 years
LMI1	Identify long-term water needs and investigate potential of increased water supply	1-3 years
LMI2	Support open space preservation in floodplains	Ongoing
LMP1	Create a needs survey that identifies special need homes or facilities needing attention in case of emergencies or evacuations	3-5 years
LMP2	Update National FEMA Floodplain Maps	1-3 Years
LMP3	Incorporate hazard mitigation plans into community plans	1-3 years
LMP4	Incorporate special needs populations into Hazard Mitigation and Emergency Operations Plans	2-5 years
LMP5	Provide more education about the burn permit process	2-5 years
LMS1	Add signage to roads in locations that frequently flood	2-4 years
LMS2	Increase cell phone coverage in rural areas	2-5 years
LLS1	Create defensible space between Woodland Home Communities and areas of high wildfire risk	5+ years
LLI1	Provide stilling and infiltration basins to capture stormwater and return it to the groundwater system	5+ years
LLP1	Track and map space available for pets at local SPCA and other animal shelters	1-5 years
LLP2	Develop driveway codes to allow emergency vehicle access	1-5 years
LLP3	Investigate safety and maintenance of roads in private communities	5+ years
LLP4	Adopt state fire codes and hire fire code officer	5+ years
LLP5	Develop more strict building and landscaping codes to prevent forest fires	5+ years
LLP6	Reduce pollution discharge via stormwater systems	5+ years
LLMP1	Incorporate hazard mitigation plans into community plans	1-5 years
LLLS1	Bury utilities underground in town of Louisa	1-5 years
LMMP1	Incorporate hazard mitigation plans into community plans	1-5 years
LMLS1	Bury utilities underground in town of Mineral	1-5 years
NHE1	Provide educational instruction and materials to school age youth and their teachers on proper procedures for responding to natural disasters	1 year
NHP1	Encourage residents to build and maintain private driveways adequate for emergency vehicles	Ongoing

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
NHP2	Complete installation of Reverse E-911 System	1-2 years
NHS1	Upgrade communication system	When funding is secured
NHS2	Install generators at all emergency shelters	1-3 years
NHS3	Ensure that all houses have properly placed, current 911 street addresses	1-3 years
NHS4	Install drone sirens at each fire and rescue station	1-5 years
NME1	Conduct Firewise Workshops	1-5 years
NMI1	Update FEMA floodplain maps	2-5 years
NMS1	Investigate potential to elevate or otherwise protect roads from flooding: Rt. 617, 29 at Nelson County High School, Knuckle Run, Colleen by Woodland Church, Rt. 56 at Tye River, Rt. 632 at Rockfish River, Johnson Hollow	2-5 years
NMS2	Create defensible spaces between Woodland Home Communities and areas of high wildfire risk	3-5 years
NLP1	Strengthen policy to prohibit development in or near floodplains	3-5 years
NLP2	Join the Community Rating System	5+ years
NLP3	Strengthen building codes to protect homes from wildfires	3-5 years
NLP4	Develop cooperative agreement with surrounding jurisdictions and institutions of higher education to improve communiciations	2-3 years

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action
is to provide easy reference to the mitigation action

R	Regional
A	Albemarle
AS	Albemarle - Town of Scottsville
C	Charlottesville
F	Fluvanna
FC	Fluvanna - Town of Columbia
G	Greene
GS	Greene - Town of Stanardsville
L	Louisa
LL	Louisa - Town of Louisa
LM	Louisa - Town of Mineral
N	Nelson

Priority

H	High
M	Moderate
L	Low

Mitigation Action Type

E	Education and Outreach
I	Information and Data Development
P	Planning, Policy, and Funding
S	Structural

Monitoring, Evaluating, and Updating the Plan

The Hazard Mitigation Working Group, supported by TJPDC staff, will implement maintenance activities. The group will meet annually in May or following a major disaster to evaluate progress and review annual impacts or actions which may necessitate changes in the plan. Annual reports will be presented to the TJPDC prior to the May meetings.

The plan will undergo a comprehensive review and evaluation every five years by the Working Group and the TJPDC under the authority of the Board of Supervisors and City Council. The first review will be submitted to FEMA on or before August 1, 2010. The evaluation will address whether:

1. goals and objectives address current and expected conditions;
2. the nature, magnitude, or type of hazard affecting the region has changed;
3. current resources are appropriate for implementing the plan;
4. important problems such as technical, political, legal, or coordination issues with other agencies have occurred;
5. agencies and other partners are participating as originally proposed.

Ongoing public involvement will be critical to ensure the most accurate and up-to-date plan. Significant amendments to the plan will require a public hearing and other efforts to involve the public will be made as necessary.

Contact Information

Each locality has received a copy of the completed plan to keep on file at the county or city office. The TJPDC will post the plan on their website (www.tjpdc.org/environment/hazard.asp).

Members of the public are welcome to submit comments, suggestions or feedback on the plan to the TJPDC, as well as to volunteer to be involved with hazard mitigation efforts. TJPDC and localities represented in the plan will continue efforts to coordinate with volunteer community groups.

At the time of the 5-year review and updating of the plan, the TJPDC will notify the public of the process and will invite public comment and participation.

If you would like more information about the Thomas Jefferson Planning District Regional Hazard Mitigation Plan, contact:

Harrison Rue, Director
Thomas Jefferson Planning District Commission
P.O. Box 1505
401 E. Water Street
Charlottesville, VA 22902
Telephone: (434) 979-7310
Fax: (434) 979-1597
Email: info@tjpdc.org
Virginia Relay Users: Dial 711

Introduction

This section provides a general introduction to the Thomas Jefferson Planning District Commission's Regional Hazard Mitigation Plan. It is broken down into the following six sub-sections:

1. Background
2. Sections of the Plan
3. A Practical Approach to Hazard Mitigation Planning
4. Purpose
5. Scope
6. Documentation of Adoption by All Localities

Hazard: An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss.

Mitigation: Sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards and their effects. Note that this emphasis on long-term risk distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery.

Background

Costs from natural disasters are growing nationwide. The Thomas Jefferson Planning District is no exception. With more people living in areas susceptible to natural hazards, the costs associated with such hazards are also increasing. The localities located in the Thomas Jefferson Planning District (the Counties of Albemarle, Greene, Fluvanna, Louisa, and Nelson, the City of Charlottesville, and the Towns of Scottsville, Columbia, Stanardsville, Louisa, and Mineral) have experienced tremendous growth in the past decade. In order to lessen the growing cost of disaster recovery on the localities, there is a growing need to mitigate the impact of known hazards. Through proper planning and the implementation of policies and projects identified in this Hazard Mitigation Plan, the region and the localities can reduce the likelihood that these events will result in costly disasters.

This Regional Hazard Mitigation Plan begins to take the necessary steps to mitigate natural hazards in our region. **Hazard mitigation** is any sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. It includes both structural measures, such as protecting buildings and infrastructure from the forces of nature and non-structural measures, such as natural resource protection and wise floodplain management. Actions may be targeted to protect existing development, or could be designed to protect future development as well. It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made.

This Plan systematically identifies potential hazards and sets goals for implementation over the long-term that will result in a reduction in risk and minimize future losses community-wide. The

purpose of hazard mitigation planning is to identify potential risk areas, such as flood plains, and develop plans to make communities and businesses more resistant to damage from natural hazards. Unlike emergency operations plans or disaster preparedness, this plan seeks to develop ways to lessen the impact of natural disasters on the region's resources through strategic, long range planning. The overall goal of hazard mitigation is to save lives and reduce property damage.

The Thomas Jefferson Planning District Commission's long-term goal is to create community disaster resistance through planning for hazard mitigation before disaster strikes, and to ensure that through recovery planning for land and waterways, the community integrates the concepts and principles of sustainable development through preparedness, prevention, recovery, and reconstruction phases of the process.

Sections of the Plan

This Plan is designed to meet the requirements of the Disaster Mitigation Act of 2000 (DMA2000). The Hazard Mitigation Plan includes the following sections:

1. Planning Process
2. Community Profile
3. Hazard Identification and Analysis
4. Vulnerability Assessment
5. Capabilities Assessment
6. Mitigation Strategies
7. Plan Maintenance Procedures

The **Planning Process** section describes the process by which this plan was developed including a description of the planning team, and overall stakeholder involvement.

The **Community Profile** was completed predominantly through investigative research, along with the use of GIS (geographic information systems) and best available data. It includes narrative descriptions of community characteristics, such as the region's geographical, economic and demographic profiles, and discusses future development trends and implications for hazard vulnerability.

The **Hazard Identification and Analysis** section describes natural hazards in the order in which they pose the greatest threat to the Thomas Jefferson Planning District. It includes a description of the hazard as well as analysis based upon historical data.

The **Vulnerability Assessment** provides an inventory of existing population and buildings, describes development trends, and offers estimates of potential loss based upon historic events as well as local, state, and national data.

The **Capabilities Assessment** provides an examination of the region's capacity to implement meaningful mitigation actions, and identify existing opportunities for program enhancement. Capabilities addressed in this section include staff and organizational capability, technical capability, policy and program capability, fiscal capability, legal authority and political will. The

purpose of this assessment is to identify any existing gaps that may hinder mitigation efforts, and to identify those activities that can facilitate risk reduction efforts.

The **Mitigation Strategy** forms the basis for action — identifying broad policy goal statements, more specific policy objectives and specific action-oriented hazard mitigation actions. Hazard mitigation actions include both policies and projects designed to reduce the impacts of hazardous events.

The **Plan Maintenance Procedures** section describes how the Plan will be implemented, and procedures for monitoring, evaluating, reporting and updating the Plan.

A Practical Approach to Hazard Mitigation Planning

This plan is designed to address natural hazards in the Thomas Jefferson Planning District Commission and to develop prioritized mitigation projects to lessen the impact of natural disasters on the region.

The **benefits of hazard mitigation** are numerous, including:

- Saving lives and reducing property damage
- Protecting critical community facilities
- Reducing exposure to liability
- Minimizing community disruption
- Reducing long-term hazard vulnerability
- Contributing to sustainable communities

More importantly, mitigation planning has the potential to produce long-term benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that a pre-disaster investment significantly reduces the demand for post-disaster assistance. Further, the adoption of mitigation practices enables local residents, businesses, and industries to more quickly recover from a disaster, getting the economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health and natural features, and enhancing recreational opportunities.

Examples of mitigation measures include:

- Promoting sound land use practices based on known hazards (zoning, floodplain management, and subdivision ordinances)
- Relocating or elevating structures out of the floodplains
- Distributing information to citizens about risks, mitigation, and preparedness
- Developing, adopting, and enforcing effective building codes and standards
- Engineering roads and bridges to withstand hurricanes and earthquakes
- Using fire retardant materials in new woodland construction
- Structural projects, such as dams, diversions, storm sewers, elevated roadways
- Encouraging adequate insurance, including flood insurance, as final protection against financial loss

- Complying with Federal and State regulations to reduce disaster costs and protect critical facilities

Another important aspect of hazard mitigation is increasing the disaster-resistance and sustainability of a community. Several factors are essential for creating a disaster-resistant, sustainable community:

- Planning at all levels – to ensure that preparedness and prevention become integrated throughout the State
- Partnerships – to stimulate and provide motivation for win-win solutions to reducing cost and reaping benefits
- Public education and outreach – to reach the general public, special needs populations, youth, and children
- Active recruitment of individuals, businesses, and organizations that are visionary as well as pro-active to join in the efforts of promoting disaster-resistant communities
- Marketing success – to educate and raise awareness for the necessity and benefits of effective mitigation
- Consensus on community goals and strategies for achieving them.

Purpose

The purpose of this Plan is:

1. To protect life, safety and property by reducing the potential for future damages and economic losses that result from natural hazards;
2. To meet the requirements of the Disaster Mitigation Act of 2000, and therefore qualify for additional grant funding in both the pre-disaster and post-disaster environment;
3. To speed recovery and redevelopment following future disaster events;
4. To demonstrate a firm local commitment to hazard mitigation principles; and
5. To comply with both state and federal legislative requirements for local hazard mitigation plans.

Scope

This Plan will focus on those hazards determined to present the greatest risk in the region. It covers the Thomas Jefferson Planning District, which includes the Counties of Albemarle, Fluvanna, Greene, Louisa, and Nelson and the City of Charlottesville. The Commonwealth of Virginia recently completed a statewide Hazard Mitigation Plan in conjunction with the regional plans.

Documentation of Adoption by all Localities

201.6(c)5: For multijurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

The plan will be formally adopted by each of the six localities in the Thomas Jefferson Planning District after approval by FEMA in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000 (DMA2000). DMA2000 established new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). DMA2000 states that all localities must have a Hazard Mitigation Plan in place in order to be eligible for HMGP funding. DMA2000 is intended to facilitate cooperation between state and local authorities on risk reduction measures and to expedite funding allocation.

The agenda and minutes from each Planning Commission and Board of Supervisors or City Council meeting at which the plan was adopted contingent on FEMA approval are included in the appendix. All six participating localities approved the locality's portion of the plan for submission to FEMA. The approval process included a public hearing and action by the planning commission and elected body of each locality.

Resolutions documenting the formal adoption of the plan by the six participating localities and the five towns in the region following FEMA approval will be included in the appendix.

Planning Process

This section describes the planning process undertaken by the Thomas Jefferson Planning District Commission in preparation of the Regional Hazard Mitigation Plan. Specific topics include:

- Documentation of the Planning Process
- Coordination Among Agencies
- Timeline
- Planning Committees and Working Group
- Public Involvement

Documentation of the Planning Process

201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; (2) an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and (3) review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

A key feature of the development of the plan has been achieving widespread participation and input from stakeholders through the Planning District. Documentation of the planning process including meeting notes, sign-in sheets, and survey results are included in the appendices.

The following sections describe the planning process, timeline, agencies and individuals involved, and public participation.

Coordination Among Agencies

44 CFR 201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process.

This plan was developed by the Thomas Jefferson Planning District Commission and was guided by a Working Group, consisting primarily of planners and emergency operations coordinators in each locality, with input from an Advisory Committee made up of a wide range of community

representatives including business owners, community-based organizations, and various local, state, and federal government agencies. Prior to receiving state and federal funding to develop this plan, a graduate planning class at the University of Virginia assisted in the gathering of data and organizing resources as part of their class project. One of the students from that class, Nicole Gilkeson, became a FEMA Hazard Mitigation Fellow and worked closely with the Thomas Jefferson Planning District Commission to develop this plan.

In addition to regional meetings, meetings were held in each locality, often in conjunction with the Local Emergency Planning Committee.

Timeline

44 CFR 201.6(c)(1): The plan must document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Work Plan by Time Table

The following table begins July 2004 with receipt of a grant from VDEM to undertake the planning process. However, TJPDC staff, along with UVA planning students, began the data collection phase early in 2004. The Advisory Committee met twice – once in February 2004 and once in May 2004 – before the official start date of the grant.

Task	7/04	8/04	9/04	10/04	11/04	12/04	1/05	2/05	3/05	4/05	5/05	6/05	7/05	8/05	9/05	10/05	11/05	12/05	1/06	2/06	3/06
Execute grant contract	◆																				
Working Group Meeting			◆	◆	◆			◆									◆				
Advisory Committee Meeting						◆												◆			
Data Collection	→	→	→	→	→	→◆															
Meet with LEPCs and locality staff	→	→	→	→	→	→	→	→	→	→	→	→									
On-line survey			→	→	→	→	→	→	→	→	→										
Develop HIRA portion of plan. Submit to VDEM	→	→	→	→	→	→◆															
Develop mitigation portion of plan							→	→	→	→	→	→◆									
Presentation and approval to localities											→	→	→◆								
Submission and Review by VDEM													→	→◆							
Response to VDEM comments															→	→◆					
Submission and Review by VDEM/FEMA																→	→	→◆			
Formal Adoption by localities																		→	→	→	→◆

Work Plan by Task and Responsible Parties

PLANNING COMMITTEE (Pre-award and on-going)	
Tasks: • PDC staff met with Dave Phillips, UVA, to discuss student involvement in the project (Dec. 2003) • PDC staff met with students (Jan. 22 & 27, April 1) • Convened Regional Mitigation Advisory Committee (Feb. 2004) • Convened Regional Mitigation Advisory Committee (May 2004) • Developed Memorandum of Understandings with each locality (July 2004) • Convened Working Group monthly (Sept. 8, Oct. 5, Nov. 4) • Convened Regional Mitigation Advisory Committee (Dec. 2004)	
DATA COLLECTION (Pre-award – Sept 30, 2004)	
Tasks: • Collected data from localities • Compiled and analyze data for HIRA	
HAZARD IDENTIFICATION AND RISK ASSESSMENT (July – December 2004)	
Tasks: • Profiled hazards using available data • Developed appropriate graphics • Reviewed, documented, referenced, and summarized findings • Solicited, received, and incorporated public comment in all participating localities on results of HIRA, vulnerability and loss estimation analyses	
• Submit HIRA vulnerability and loss estimation results for review by State	
• Review of HIRA results and other local/regional plans for proposed mitigation goals, strategies, and projects	VDEM
CAPABILITY ASSESSMENT (by November 2004)	
• Identified each locality's assets • Analyzed current and future development trends • Estimated the potential losses in order to assess the current and future vulnerabilities to the identified hazards	
GOALS, STRATEGIES, AND PROJECTS (Dec – July 2005)	
Tasks: • Develop mitigation goals, strategies and projects • Evaluate the benefit costs of the proposed mitigation goals, strategies, and	TJPDC, HMP Committee

projects, and prioritize the overall list • Prepare the initial project data sheets for each identified mitigation project • Solicit, receive, and incorporate public comment in all participating localities on results of mitigation strategies efforts	
• Present appropriate sections of Plan to locality planning commissions and elected bodies for approval to submit to VDEM/FEMA	
• Submit draft plan to VDEM for review	
FINAL PLAN SUBMISSION AND REVIEW (August – Oct 2005)	
Tasks: • Solicit, receive, and incorporate public comment in all participating and surrounding localities on final draft plan	TJPDC
• Incorporate State comments and prepare final plan for FEMA review, submit final plan to State to submit to FEMA	TJPDC
• FEMA review process and pre-approval	FEMA – allow two months for review
PLAN ADOPTION PROCESS (Dec 2005 – Feb 2006)	
• Formal adoption by localities and towns	TJPDC; HMP Committee; CAOs
FEMA FINAL PLAN APPROVAL (Feb – March 2006)	
Tasks: • Final FEMA review and plan approval	FEMA
• Publish FEMA-approved HMP for distribution	TJPDC

Planning Committees and Working Group

44 CFR 201.6(c)(1): The plan must document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The Working Group met monthly and included representatives from each of the five participating counties and the City of Charlottesville. Towns in the region were represented by their respective county's Working Group member. This was necessary due to the limited staff capacity of the towns. Letters were sent to the mayors of each of the towns informing them of the process, and town documents, such as comprehensive plans, were consulted during the planning process.

The Working Group included:

Name	Affiliation
Wayne Cilimberg	Albemarle County (and Town of Scottsville)
Paul Muhlberger	Albemarle County (and Town of Scottsville)
Kristel Riddervold	City of Charlottesville
Ron Higgins	City of Charlottesville
Kaye Harden	City of Charlottesville, Albemarle County, University of Virginia
Steven Biel	Fluvanna County (and Town of Columbia)
Shelly Wright	Fluvanna County (and Town of Columbia)
David Lawrence	Greene County (and Town of Stanardsville)
Katy Clossin	Greene County (and Town of Stanardsville)
Michael Schlemmer	Louisa County (and Towns of Mineral and Louisa)
Ernie McLeod	Louisa County (and Towns of Mineral and Louisa)
Fred Boger	Nelson County

The Advisory Committee met at critical milestones to provide input into the process. The Advisory Committee was designed to include a wide range of individuals with diverse interests, skills, and backgrounds. It is not a fixed group. We anticipate that participation on the Advisory Committee will continue to grow throughout the planning process. The Advisory Committee meetings were announced on the TJPDC website as well as advertised through press releases sent to all of the locality newspapers and radio stations. Additionally, fliers were emailed to potentially interested organizations and citizen groups, and handed out at a Charlottesville City Streams Task Force Meeting. The following people attended at least one of the Advisory Committee meetings:

Name		Affiliation
Melissa	Barlow	VA Dept of Transportation
Mary	Basiliere	American Red Cross
Steven	Biel	Fluvanna County Planning Department
Fred	Boger	Nelson County
Pamela	Buke	Health Department
Wayne	Cilimberg	County of Albemarle Planning
Jonathon	Earl	Alb County Police Dept
Nicole	Gilkerson	UVA Planning Dept
Donald	Hackler	Thomas Jefferson Health District
Kaye	Harden	Alb, Cville, & UVA
Ron	Higgins	Charlottesville Neighborhood Development Svc
Deborah	Lamb	Louisa County
David	Lawrence	Greene County Emergency Services Coordinator
Frances	Lee-Vandell	TJ Health Department

Ernie	McLeod	Louisa County
Barrett	McVary	
Greg	Meade	U.S. Department of Forestry
Nancy	Miner	Fluvanna LEPC
Paul	Muhlberger	Alb. County Public Works
Lory	Pendergraph	UVA Planning Dept
Mike	Peoples	Central VA Chapter American Red Cross
David	Phillips	University of Virginia-Urban Planning
Katie	Phillips	American Red Cross
Leigh	Rosen	UVA Planning Dept
Jessica	Ryan	University of Virginia
Brittany	Schaal	VA Dept of Emergency Management
Michael	Schlemmer	Louisa County Emergency Services Coordinator
Matthias	Smith	Louisa County GIS Coordinator
Denise	Stephenson	American Red Cross
Bruce	Sterling	Virginia Dept of Emergency Management
Stan	Tatum	Land Planning & Design Associates
Milton	Thacker	VA Department of Transportation
Jeff	Werner	Piedmont Environmental Council
Steve	Whitehead	American Red Cross
Chris	Willis	UVA Facilities Management
Shelly	Wright	Fluvanna County

Meetings were held in each locality, often in conjunction with the Local Emergency Planning Committee, to raise awareness about the development of the Hazard Mitigation Plan and to solicit feedback. One information session was held to gather feedback on the Hazard Identification and Risk Assessment portion of the plan, and one meeting was held to brainstorm for locality-specific potential mitigation actions. Meetings were held in Fluvanna County on October 21, 2004 and January 21, 2005, in Greene County on December 20, 2004, in Nelson County on January 16, 2005 and February 15, 2005, and at the Charlottesville/Albemarle/University of Virginia LEPC meetings on October 27, 2004, and January 26, 2005.

The Thomas Jefferson Planning District Commission held weekly internal meetings with staff to coordinate responsibilities, including mapping, data collection, writing, scheduling meetings, and public outreach.

The *Virginia Hazard Mitigation Summit: Planning for Disaster Resilient Communities* was held June 16-18, 2004 at the University of Virginia. The conference brought together citizens and professionals concerned with mitigation planning. State agency representatives, local planning officials, consultants, citizens and university faculty attended the event. The Summit was organized around 25 presentations, highlighting a broad range of experiences with hazard mitigation. TJPDC staff as well as members of the Working Group and Advisory Committee actively participated in the Summit.

Public Involvement

44 CFR 201.6(c)(1): The plan must document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The first open meeting of the Regional Hazard Mitigation Advisory Committee was held on February 26, 2004. This group is made up of TJPDC staff, staff from the localities including planners, administrators, and emergency managers, University of Virginia representatives, as well as others from stakeholder groups such as the Virginia Department of Transportation, Virginia Power, the Virginia Department of Forestry, the Red Cross, and the Piedmont Environmental Council, and interested citizens (lists of participants and meeting agendas are included in the appendices). Additional meetings were held on May 4 and December 8 of 2004, and are planned to occur up to plan adoption. Meetings have been advertised on the TJPDC website (www.tjpdc.org/environment/hazard.asp), which has been a fundamental way of communicating our progress with the public. The May 4, 2004 meeting was also advertised in the TJPDC's E-News e-mail newsletter, with a distribution of about 2,000, including representatives of a great diversity of local organizations. Newspaper and radio coverage aided in the distribution of information and announcement of public meetings; newspaper coverage included an article in the Daily Progress (the only daily paper in the region), which included an announcement of the December 8, 2004 meeting, and an article in the Nelson County Times, which included the date and time of the Nelson County Planning Commission's public hearing on the plan. For the December 8, 2004 meeting, a flyer was prepared which was handed out at many other meetings that staff attended, including a standing-room only public meeting about Charlottesville streams. (Articles and notices are included in the appendices.) Brief synopses as well as excerpts from presentations were posted following each of the meetings. The website also hosts a natural hazards website completed by University of Virginia graduate planning students which explains the risks associated with each hazard and provides links for community members to prepare for disasters. Each locality held public hearings on the draft Plan with the Planning Commission and elected body. A table in Appendix A lists the dates for each public hearing. Minutes or excerpts of actions taken are also included in Appendix A. The Plan as submitted to VDEM was posted on the TJPDC web site and an article was included in the TJPDC E-News.

In September 2004, a survey was added to the website for completion by community residents. The survey was uploaded during this year's particularly bad hurricane season, which brought severe weather, flooding and tornadoes in or near the region. The survey was adapted from the survey in the FEMA How-To series and the State of Arkansas Department of Emergency Management. Composed of 15 questions, community members were polled as to their experiences with hazards, flood insurance, and best opportunities for information exchange, and were asked to provide comments pertaining to goals and projects they would like to see take place in the region. The purpose of this survey was not only to meet the requirements for participation, but also to ask for local knowledge and ideas about potential mitigation strategies. The survey was publicized on the TJPDC website and through the E-News newsletter, with all involved localities being asked to add a link to the survey on their homepage, and promoted through press releases about the survey

and opportunities for involvement, which were sent to all local newspapers and radio stations. The Daily Progress included an announcement of the survey on the first page of its "Region & State" section. Over 50 residents used the survey to provide their input into the plan. The results of the survey are included in the appendices. Mitigation actions proposed in survey responses were included in the plan. Additionally, local residents in Greene County who had submitted photos of a recent tornado to the local news channels were called to ask for permission to post these images on our website. In doing this, we were able to increase awareness of the mitigation process and gain more involvement. TJPDC staff also submitted letters to the editors of every local newspaper, explaining the importance of mitigation and involvement in the planning process in light of the recent hurricane season. Making people aware of the process, inviting people to open meetings, and encouraging participation in the survey were key actions in the beginning stages of the planning process.

Encouraging active stakeholder support will be vital to engage the public. The staff team is planning on seeking letters of support from local leaders and locality members in hopes of gathering more input into the planning process. Other future plans for public involvement include posting information in other area organizations' newsletters, speaking to related community-based organizations, placing ads in papers for future meetings, holding public meetings at each locality while the plan is under review for adoption, and administering a needs survey to determine where residents may need added help and protection before and during hazards.

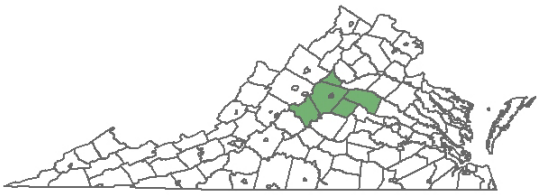
All surrounding localities and planning district commissions were notified of the Plan in September 2005, and given the opportunity to comment. This included a total of nine neighboring counties – Orange, Madison, Rockingham, Augusta, Amherst, Buckingham, Goochland, Hanover, and Spotsylvania – and six planning district commissions – Central Shenandoah, Central Virginia, RADCO, Region 2000, Richmond Regional, and Piedmont. The letter and distribution list used for notification are included in Appendix A. No comments were received.

Community Profile

The Thomas Jefferson Planning District is located roughly in the geographic center of the Commonwealth of Virginia. The Planning District is made up of the counties of Albemarle, Fluvanna, Greene, Louisa and Nelson, the City of Charlottesville and the incorporated towns of Columbia, Scottsville, Louisa, Mineral and Stanardsville. The Planning District is home to historic resources such as Monticello and Ash Lawn-Highland, as well as the University of Virginia.

This section includes several features of the Thomas Jefferson Planning District Commission including:

1. Geography
2. Population and Demographics
3. Economic Growth and Development
4. Transportation
5. Housing
6. Disaster Declarations



Geography

The Thomas Jefferson Planning District is in the Piedmont region of Virginia. It is bounded by the Blue Ridge Mountains on the west with ridges and foothills and hollows rolling down to the James River in the east. Elevations range from more than 2,500 feet above sea level in the mountains to roughly 200 feet at Columbia on the James River. Areas of relatively flat land are found in larger river valleys and floodplains. Most of the land has a slope of some kind. Total land area is 2,155 square miles.

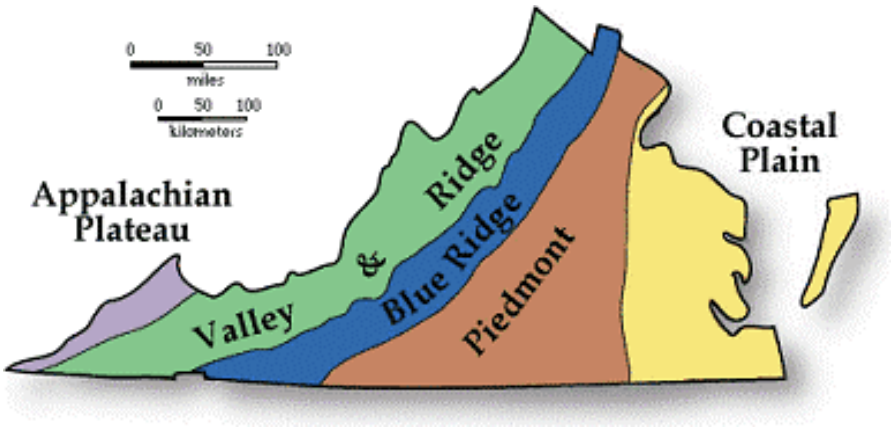
The area is drained west to east by six major rivers: the Tye, Rockfish, Hardware, Rivanna, Anna, and Rapidan. Area rivers generally headwater in the mountains and flow to the James River, which provides major drainage and flow east to the Chesapeake Bay. The Rapidan and Anna Rivers drain into the Rappahannock and York Rivers respectively, which also reach the Bay.

The area has a moderate climate. Average temperatures are approximately 50 degrees, and range from January lows in the mid 20s to July highs in the high 80s. Annual rainfall averages above 40 inches and is supplemented with approximately 14 inches of snow.

There are a few large river dams in the district: one on the Rivanna for drinking water and one at Lake Anna for the nuclear power plant. Smaller streams have been dammed to create resort lakes, such as Lake Monticello, Twin Lakes, Lake Nelson, Ruritan Lake, and Lake Louisa.

The vast majority of land is either field or forest, with development occupying the remainder. Crop farming is found in larger scale to the south and east, away from the mountains, where land is flatter. Hay and grains are the majority crops, with some corn and other row crops. Orchards and vineyards are prevalent in the high hills. Livestock fields are also common, for cattle, horses, sheep, and a variety of other animals. Timberland can be found in all parts of the district, with large tracts in the east and James River area. For the Rivanna Watershed, which encompasses 35% of the Planning District, tree canopy accounts for approximately 64% of the basin, grazed pasture lands 20%, low-density residential 8%, other grassed areas 4%, medium-density residential 2%, and cropland 1%. (From *State of the Basin Report: 1998*).

Soils in the district are generally moderately- to well-drained, with a surface layer moderately low in organic content, and usually consisting of gravelly silt or fine sandy loam about 9-12" deep. The soils also generally have a low to moderate shrink-swell potential. Soils differ across the geographic spectrum in their slope, total depth, and permeability.



Parts of the Thomas Jefferson Planning District lie in the Blue Ridge province, while most of it is in the Piedmont province (see above). The Blue Ridge province forms a basement massif with Mesoproterozoic crystalline rock in its core and Late Neoproterozoic to Early Paleozoic cover rock on its flanks. The Blue Ridge province is allochthonous (formed in a place other than where it is found) and has been thrust to the northwest over Paleozoic rocks of the Valley and Ridge province. Although earlier deformation events are recorded in the older igneous and metamorphic rocks, the Blue Ridge is a contractional structure that experienced deformation and crustal shortening during the Paleozoic.

The Piedmont is the largest physiographic province in Virginia. It is bounded on the east by the Fall Zone, which separates the province from the Coastal Plain, and on the west by the mountains of the Blue Ridge province. The province is characterized by gently rolling topography, deeply weathered bedrock, and a relative paucity of solid outcrop. Rocks are strongly weathered in the Piedmont's humid climate and bedrock is generally buried under a thick (2-20 m) blanket of saprolite. Outcrops are commonly restricted to stream valleys where saprolite has been removed by erosion. The topography becomes somewhat more rugged with proximity to the Blue Ridge, where local monadnocks of more resistant rock occur. *(From The Geology of Virginia, http://www.wm.edu/geology/virginia/)*

Most of the ridges of the Blue Ridge are either part of the Shenandoah National Park or the Washington/Jefferson National Forest. Land use in these areas is controlled by regulations of the federal Department of Interior or Department of Agriculture.

Population and Growth Projections

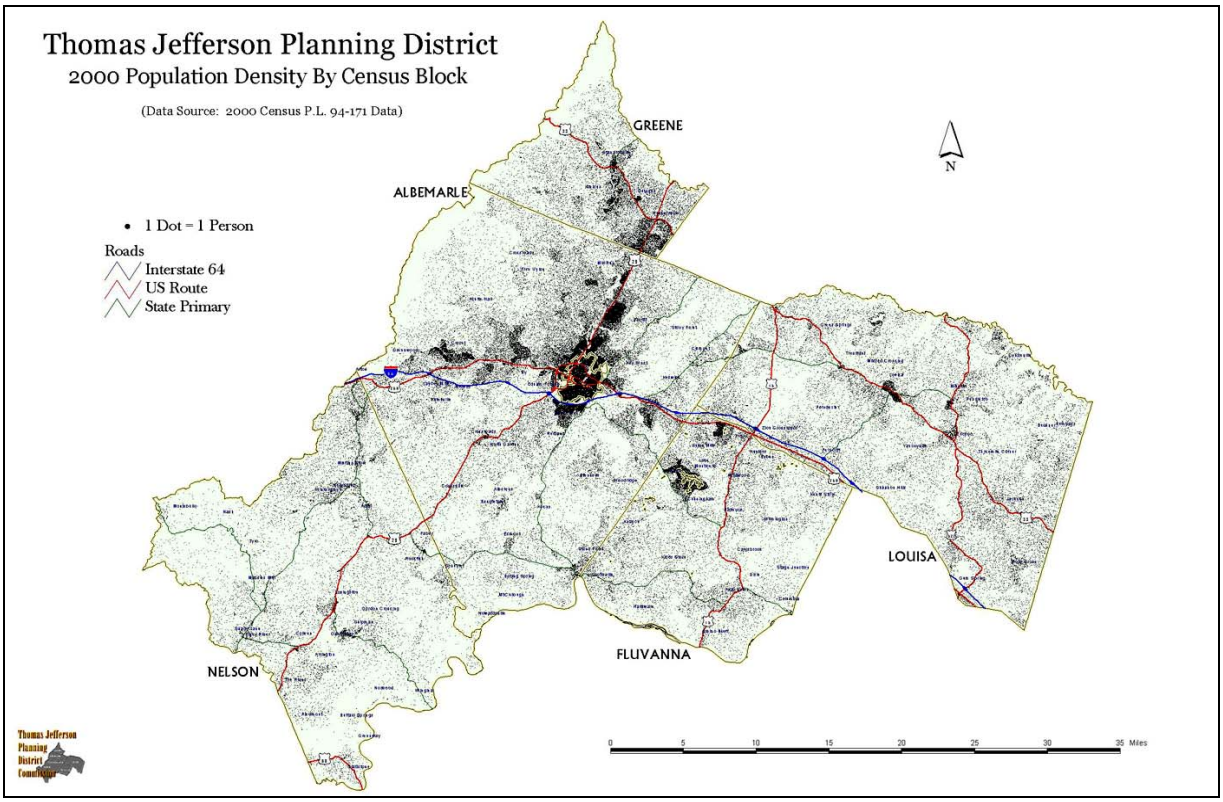
As the following population figures show, the region has grown by approximately 19% from 1990 to 2000. All of the jurisdictions have grown substantially, except for the City of Charlottesville, which has lost population. The region, as a whole, is expected to grow dramatically over the coming decades, evidenced by the projections below from the Virginia Employment Commission.

Population History and Projections

Locality	1990	2000	2010	2020	2030
Charlottesville	40,341	40,099	39,600	39,600	39,600
Albemarle	68,040	84,186	97,200	107,400	117,400
Fluvanna	12,429	20,047	28,100	34,300	39,200
Greene	10,297	15,244	19,500	24,000	28,400
Louisa	20,325	25,627	29,100	32,600	36,200
Nelson	12,778	14,445	15,100	15,900	16,600
Region	164,210	199,648	228,600	253,800	277,400

Source: US Census (1990, 2000), VEC projections dated 5/03 (2010-2030)

Major population centers and growth areas can be identified using census data and local comprehensive planning information. The City of Charlottesville and the surrounding urban ring in Albemarle County are home to roughly half the population of the Planning District. Fluvanna, Greene and Louisa are in the top 15 fastest growing counties in the state. The Route 29 corridor and the I-64/250 corridor are the major residential, commercial, and industrial areas outside of the City and small towns. Most localities have policies in effect to persuade growth around existing centers and reduce the potential for sprawling development over time.



This population dot density map (one dot per person) shows concentrated growth around Charlottesville and Rt. 29N – as well as significant growth just over the border into Fluvanna and Greene Counties.

Land Use and Development Trends

Central Virginia is an attractive place to live and work, and therefore all localities in the Thomas Jefferson Planning District are growing in population, with the City being relatively stable. Higher costs of living in the urban core and in Albemarle County have made growth in the rural counties more attractive. Local comprehensive plans and zoning are generally keeping denser growth limited to the city and town areas, but major roadway corridors are seeing rapid growth as well. The result is growing populations in areas lacking many services that support modern needs.

As growth occurs, more houses, roads, commercial services, communications, fire and rescue, and public facilities will be built to service the growing population. Schools are often used as shelters, and should be built to a standard that allows them to be used as such. New water and sewer treatment plants and infrastructure are expected, and are required to be built to hazard-proof standards. New roads are expected in the urban core and small towns. Solid waste services and collection points may also change and grow in all areas.

Residential: The primary change of use for most land in the region is into some form of residential use. There are a number of estates in the area that hold large tracts of undeveloped "residential" land, and that land use is not expected to change as wealthy landowners do not tend to convert to subdivisions quickly.

Agriculture and Forestry: Land in farms and forestry is slowly converting to mainly residential and estate uses across the region. The George Washington National Forest is not expected to change size, but may be more or less open to logging depending on economic and political forces.

Open Space: This land is slowly being converted to residential and commercial uses. Rural counties are strongly encouraging conservation easements. The Shenandoah Park is not expected to change in area. The increasing application of conservation design standards to subdivisions is increasing the amount of preserved open space as rural land converts into residential use. Large estates under wealthy ownership also help preserve large areas of undeveloped land.

Commercial: Commercial land uses are increasing, and generally occur in strip style development near residential areas. Each county has received a Food Lion shopping center within the past five years. New zoning codes may reduce the impervious surfaces and other design elements which may increase the damage caused by natural hazards. Large retail areas are planned and under construction in the urban areas outside of Charlottesville (Route 29, Pantops, and 5th Street).

Public Space: Each county and town has at least one public park. Roadways are a growing public land use, particularly in developed and developing areas. New subdivisions are required to provide some form of public space, and conservation subdivisions often preserve large natural areas for public use. Wildlife Management Areas in the region have the potential to change ownership, but may continue to exist as some type of public space.

Albemarle
Albemarle County has defined development areas around the City of Charlottesville and north of the City along the Route 29 corridor, in the area of Crozet to the west of Charlottesville and along Route 250 to the east of Charlottesville. The western side of the County is bounded by the Blue Ridge Mountains and Shenandoah National Park. Outside the development areas, the remainder of the County is rolling Piedmont landscape dotted with a mix of residential, agricultural and minor commercial uses. Residential growth has been occurring both inside and outside of the development areas, but in recent years the balance has tipped to the development areas. The major commercial corridors are Route 29, particularly north of Charlottesville, and Route 250. New commercial development is continuing to take place rapidly in those areas. The Town of Scottsville is located in the southeastern corner of Albemarle on the James River. Commercial and residential growth is occurring around the periphery of Charlottesville. Apartments, strip malls, suburban retail, and car dealerships are being built on quickly developed open space and unused lots, especially around the Rivanna River along Route 29 and on Pantops Mountain along Route 250.

Charlottesville
The City of Charlottesville is basically at "build-out" at this point; some redevelopment and infill is occurring, but population has been declining very slightly. The City is entirely surrounded by the County of Albemarle and has made an agreement with Albemarle to expand no further.

Much of the City is residential, with major commercial areas being located in the Main Street area (Business Route 250 and the downtown pedestrian mall) and along Route 29. Most new development is medium or high density residential in the form of townhouses and apartments, especially along West Main Street and Jefferson Park Avenue, as well as in the Belmont neighborhood. The University of Virginia is the major landholder and employer in the City. The City features a rolling landscape and is bounded by the Rivanna River and Moore's Creek on its east and south sides, respectively.

Fluvanna

Fluvanna is one of the most rapidly growing counties in Virginia. Most of this growth has been centered on the Lake Monticello development in the western portion of the County, to the northwest of the county seat of Palmyra. This has brought minor amounts of commercial development to serve the residents; however, Fluvanna residents still largely commute to Charlottesville and Albemarle County for employment, goods and services. Fluvanna County terrain is relatively flat compared to the counties to the west, and becomes increasingly gentle as one moves east. The Rivanna River more-or-less bisects the County running northwest to southeast, and the James River forms its southern boundary. The small town of Columbia is found at the confluence of the two rivers in the southeast.

Greene

Greene is another county which has been experiencing rapid growth, primarily in the southeast along the Route 29 corridor. Conversion of farmland and forests into suburban residential and service uses will continue in the southeast portion of the county proximate to the Albemarle boundary. The rapid residential growth in this area is primarily made up of commuters to Albemarle County and Charlottesville. Increasing employment opportunities in the northern part of Albemarle County coupled with rising housing costs in Albemarle have made Greene County an increasingly attractive option for potential homeowners. Additionally, there is potential for moderate industry based on the appealing location of major highways. Some commercial development is occurring along the Route 29 corridor as well, but county residents still travel to Albemarle for many goods and services. Greene County is bounded on the west by the Blue Ridge Mountains and the Shenandoah National Park. Similar to Albemarle County, the terrain of Greene County falls away into foothills eastward from the Blue Ridge Mountains. The western half of the county is not expected to be quickly developed.

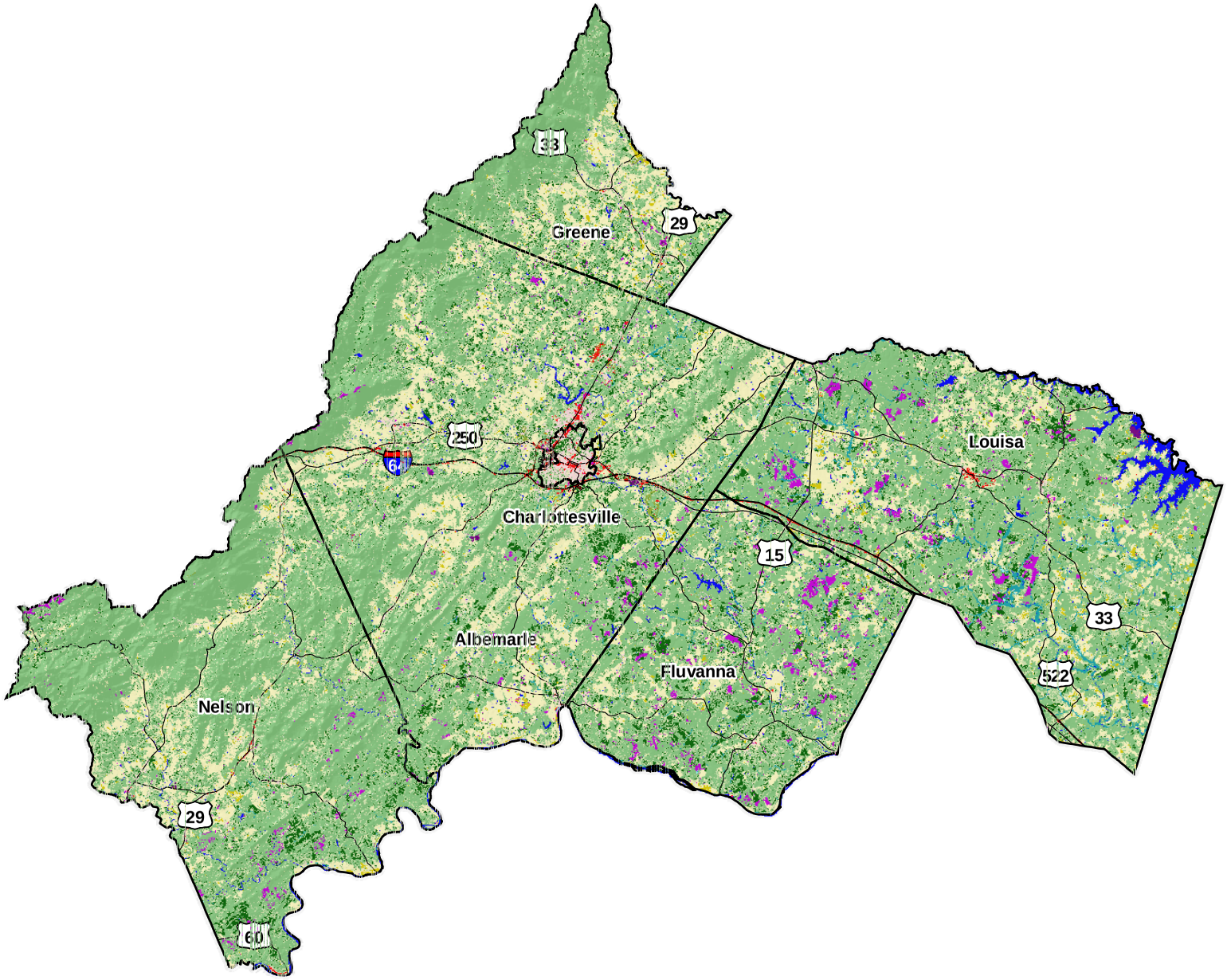
Louisa

Louisa is yet another county whose population is rapidly increasing. The population of Louisa County is relatively scattered, but concentrations are found around the towns of Louisa and Mineral in the central and east-central areas, in the Gum Spring area to the southeast, and in the Lake Anna area to the northeast, some of whose residents are seasonal. Commercial services are concentrated in the town and Lake areas and around the I-64 interchanges and are projected to increase to support the expanding population. Louisa also attracts industry. The North Anna nuclear power plant is a major employer and revenue source for the County. Like Fluvanna, Louisa has few hills and becomes flatter as one moves to the east.

Nelson

Even though Nelson is one of the slower growing counties, the northern half is growing at a rate similar to Albemarle County while the southern half is losing residents. A major residential area is the Wintergreen Resort in the Blue Ridge Mountains in the northwest part of the county, which includes many second homes. Other areas with some concentration of housing include Lovingston and Shipman near the center of the county, and Afton, near the entrances to the Blue Ridge Parkway and Skyline Drive. Nelson is bounded on the northwest by the Blue Ridge Mountains and the Blue Ridge Parkway. The George Washington National Forest takes up much of the northwestern part of the county. Nelson is the most mountainous of the counties in the planning district, although it begins to flatten as it stretches toward the James River along the southeast border. Commercial development in Nelson centers on the tourist areas near Wintergreen and Afton and near Lovingston along Route 29. Some forestry tracts are changing to residential development along the James River. It is expected that the County will see only slow growth while protecting many acres of undeveloped land.

TJPD Land Cover



- Open Water
- Low Intensity Residential
- High Intensity Residential
- Commercial/Industrial/Transportation
- Bare Rock/Sand/Clay
- Quarries/Strip Mines/Gravel Pits
- Transitional
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Pasture/Hay
- Row Crops
- Urban/Recreational Grasses
- Woody Wetlands
- Emergent Herbaceous Wetlands

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
Source: USGS National Land Cover Data, 1992
January 20, 2005 C:\GIS\HMP\Land Cover.mxd

Economic Growth and Development

The overall economic growth for the region has been very healthy, with various indicators showing a positive variation. The unemployment rates are low overall for the region when compared with the state, with the State rates at 4.9% and 2.2% for 1994 and 2000 respectively. The regional rates are considerably lower than the national figures of 6.1% and 4.0% for 1994 and 2000 respectively.

Unemployment Rate

Locality	1994	2000
Charlottesville	3.3	1.7
Albemarle	2.4	1.4
Fluvanna	3.8	1.5
Greene	3.9	1.5
Louisa	8.2	3.0
Nelson	4.0	2.3
TJPDC	3.6	1.7
VA	4.9	2.2
National	6.1	4.0

Source: Virginia Employment Commission

Reflecting national trends, the greatest increases in jobs in the Planning District have been in the service, retail, wholesale, and government sectors, while farm and manufacturing jobs have been on the decline. Major employers in the area include the University of Virginia, Martha Jefferson Hospital, State Farm, GE Fanuc, Dominion Virginia Power, Wintergreen Resort, Lexis Publishing, Crutchfield Corporation, FIC Staff Services, Piedmont Virginia Community College, Klockner-Pentaplast, and the Virginia Department of Corrections.

The following table shows changes in various non-farm employment sectors from the Virginia Employment Commission.

Nonfarm Employment in the Charlottesville MSA

	July 2002	July 2003	Employment Change	Total Percent Change
Total Nonfarm	85,200	85,700	500	.6%
Total Private	61,500	60,900	-600	-1.0%
Goods Producing	11,500	10,500	-1,000	-8.7%
Service-Producing	73,700	75,200	1,500	2.0%
Natural Res. & Construction	6,000	5,700	-300	-5.0%
Manufacturing	5,500	4,800	-700	-12.7%
Trade, Transportation	12,700	12,600	-100	-.8%
Wholesale Trade	1,400	1,500	100	7.1%
Retail Trade	9,900	9,800	-100	-1.0%
Trans, Warehouse, & Utilities	1,400	1,300	-100	-7.1%
Information	2,600	2,400	-200	-7.7%
Financial Activities	3,700	3,500	-200	-5.4%
Professional and Business	8,700	8,900	200	2.3%
Educational and Health	9,000	9,500	500	5.6%
Leisure and Hospitality	9,100	9,300	200	2.2%
Other Services	4,200	4,200	0	0%
Government	23,700	24,800	1,100	4.6%
Federal Government	1,400	1,400	0	0%
State Government	15,800	16,900	1,100	7.0%
Local Government	6,500	6,500	0	0%

Source: Virginia Employment Commission

It is evident that the hub of employment in the Thomas Jefferson Planning District is Charlottesville and the surrounding urban ring located in Albemarle County. More people commute from the outlying counties into the Charlottesville/Albemarle area than are employed in their counties of residence. Outside of the Charlottesville/Albemarle area, major employers include Virginia Power's North Anna Plant in northeast Louisa County and Wintergreen in the western portion of Nelson County. Smaller employers (less than 500 employees) are found in small communities including Stanardsville (Greene County), the Town of Louisa, Fork Union (Fluvanna County), and Lovingston (Nelson County).

The Piedmont Workforce Network (PWN), the local Workforce Investment Board, is administered by the Thomas Jefferson Planning District Commission and provides services to job seekers in the Planning District as well as the Counties of Culpeper, Fauquier, Madison, Orange, and Rappahannock. PWN uses the One-Stop Career Center System to provide services to job seekers including: finding and applying for jobs, exploring career options, learning how to use the Internet for job searches, and improving job seeking, resume writing, and interviewing skills. Current plans envision a one-stop center located in each county. PWN's One-Stop Career Center System is designed to make it easy for job seekers to get the assistance they need by providing a one-stop place for all its services. PWN certifies training providers to help job-seekers prepare for new jobs. Area training providers include:

- Charlottesville-Albemarle Technical Education Center (CATEC)
- Central Virginia School of Cosmetology
- National College of Business and Technology
- Piedmont Virginia Community College
- Regional Adult Education
- Richmond School of Health and Technology
- Technology Tamers
- Worksource Enterprises

The economic impact of a natural disaster can often be felt long after the debris is cleared. The industries that provide the majority of jobs in our region can be affected by natural disasters. For example, if a disaster were to cause temporary or permanent damage to any of the historical sites in the region, the tourism industry would be negatively impacted. Long power outages and road closures could be extremely detrimental to the employers in the region.

Transportation

Transportation within the planning district revolves around Interstate Route 64 on an east-west axis and Route 29, which is the primary north-south axis. Other major transportation corridors include Route 15, which travels roughly north-south through Fluvanna and Louisa counties, and Route 6, which passes through southern Fluvanna County and into northern Nelson County. Route 33 cuts through Greene County on an east-west axis and travels through Orange County into and through Louisa County. These other corridors do not have the capacity for heavier volumes of traffic as do Routes 64 and 29. Narrow roads and hilly conditions in rural areas may make it more difficult for larger trucks to travel, and occasional snow in winter can cause transportation delays of several days at times. Rail service runs both north-south and east-west through the region, including through Charlottesville and most small towns.

Within the narrowly defined urban area of Charlottesville and a portion of Route 29 north in Albemarle County, public transportation is provided by regular routes of the Charlottesville Transit System (CTS). Regular, hourly fixed route transit is provided and connects with the University's transit system, which provides bus service within the University community and neighborhoods. CTS runs limited hours and is not available late at night. The consequence of this is limited transportation for service sector employees, especially along the Route 29 corridor.

The other public transportation offered is through JAUNT, which provides demand-response transit throughout the region, and through Greene County Transit, which provides regular runs from Greene to Charlottesville via Route 29. JAUNT also offers fixed employment routes serving the region. The regional RideShare program matches commuters who wish to carpool.

Transportation systems are key in providing effective emergency response, but can also influence the impact of natural disasters. In addition to more immediate needs, businesses and employees suffer economic consequences when roads are closed due to natural disasters.

Housing

A general market inventory of housing in the Planning District shows that there is a continual demand for affordable housing, with low vacancy rates throughout the region. One reason for low vacancy rates and the demand for affordable housing, especially rental units, is the presence of the University of Virginia, which houses only a portion (35%) of their 19,200 students. This makes for a tight supply and continual demand, especially in Charlottesville and Albemarle. Seventy-seven percent (77%) of the housing units in the region are single family homes, 15% are multi-family, and 8%, representing 5,504 units, are mobile homes.

Number of Households

Locality	1990	2000
Charlottesville	16,099	16,861
Albemarle	24,387	31,916
Fluvanna	4,495	7,369
Greene	3,737	5,578
Louisa	7,451	9,975
Nelson	4,788	5,887

Source: US Census

The following table outlines the increases in household income over a 10-year period. It is clear that in many cases, when compared with the increase in housing costs (shown on the following page), income increases are not sufficient to keep up.

Median Household Income, in dollars

Locality	1990	2000
Charlottesville	$24,190	$31,007
Albemarle	$36,886	$50,749
Fluvanna	$31,378	$46,372
Greene	$29,799	$45,931
Louisa	$26,169	$39,402
Nelson	$23,705	$36,769

Source: US Census

Median home values are perceived to be highest in Charlottesville and Albemarle and lowest in Greene and Nelson, which shows that lower wage earners must frequently seek affordable housing far from where they work. As the following table reveals, Albemarle County home values are substantially higher, followed by the City of Charlottesville. The following figures, from the 2000 U.S. Census, are self-reported, meaning that the respondents reported the value of their homes based on their own judgment. Typically self-reported home values are lower than fair market values.

Median Home Values: Comparison of 1990 and 2000
Thomas Jefferson Planning District

Self-Reported Home Value	Alb	Cville	Fluvanna	Greene	Louisa	Nelson
1990	$111,200	$85,600	$75,100	$73,700	$64,400	$53,100
2000	$161,100	$119,000	$111,300	$111,400	$96,400	$95,100
Percent increase	45%	39%	48%	51%	50%	79%

Source: 1990 & 2000 U.S. Census

The 2000 median self-reported figures for homes in the Planning District show a substantial increase from the self-reported figures from the 1990 Census. The following table shows that actual sale prices increased significantly between 2001 and 2002. Overall, home prices in the Planning District rose 71% from an area median price in December 2000 of $143,000 to $245,000 by the second quarter of 2005.

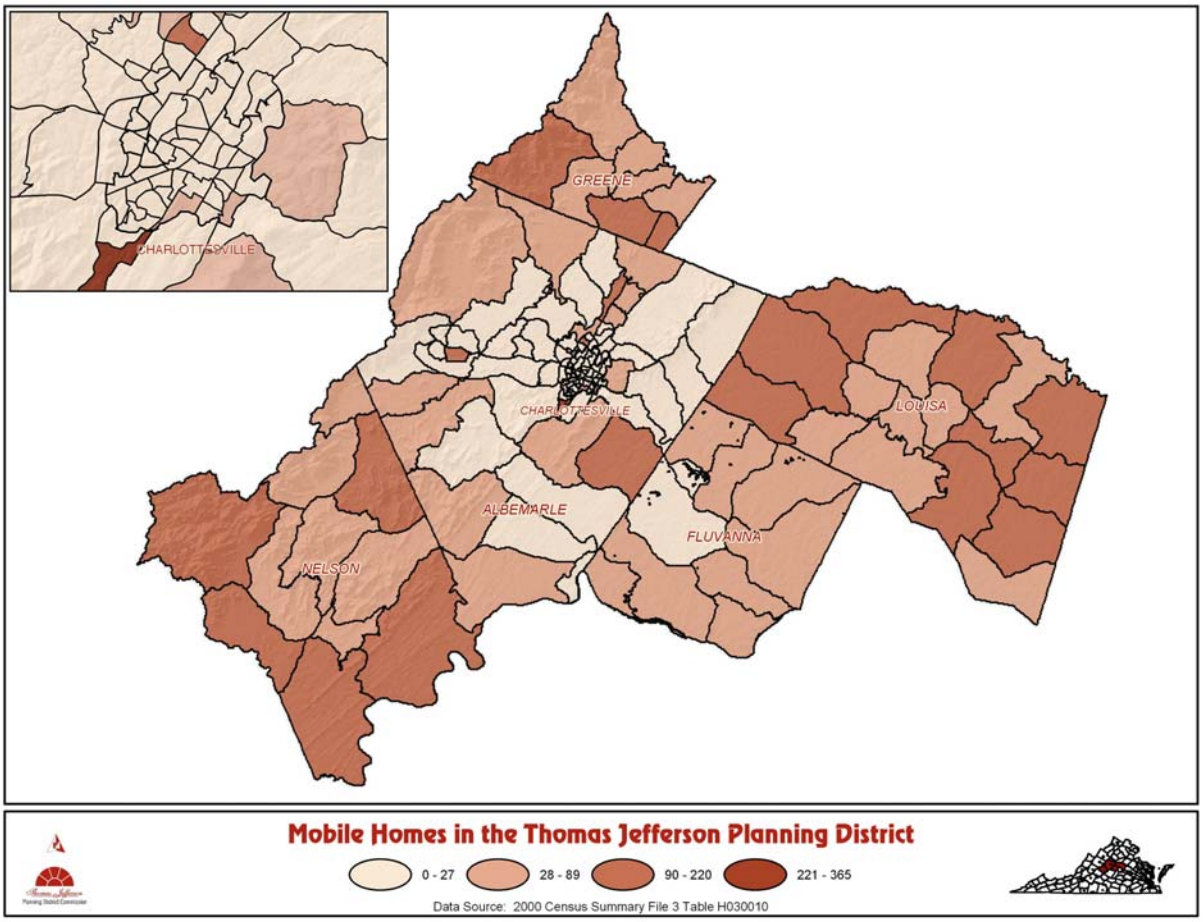
Median Sale Price: January to May 2001 - January to May 2002
Thomas Jefferson Planning District

Median Sales Price	Alb	Cville	Fluv	Greene	Louisa	Nelson
2001	$200,000	$112,500	$119,500	$136,000	$106,000	$142,000
2002	$219,000	$134,500	$136,000	$138,000	$120,000	$155,000
Percent increase	9.5%	19.5%	13.8%	1.5%	13.2%	9.2%

Source: Charlottesville Area Association of Realtors

Low income residents are often disproportionately affected by natural disasters. The only land available to low income families is often in less desirable locations, in or near high hazard risk areas, such as along flood plains. Affordable housing may not be as well constructed as other housing, and therefore is more susceptible to damage from natural hazards. Many times, people living in mobile homes, especially those that were built before 1978, are at significant risk from natural disasters. Low income families may also have less disposable income to make their homes more disaster resistant.

The following map illustrates the concentration of mobile homes in the Planning District. Mobile homes are often susceptible to extensive damage in flooding and high winds.



Disaster Declarations

The following table lists presidential disaster declarations in the state, many of which included the localities in the Thomas Jefferson Planning District Commission.

Presidential Disaster Declarations in Virginia Since 1969		
Aug.	1969	Hurricane Camille (flooding); 27 jurisdictions declared, All localities in PDC
June	1972	Hurricane Agnes (flooding); 106 jurisdictions declared, All localities in PDC
Sept.	1972	Storm/Flood; Hampton, Newport News, & Virginia Beach declared, None in PDC
Oct.	1972	Flood; Western, Central, Southeastern Virginia; 31 jurisdictions declared,
April	1977	Flash Flood; Southwestern Virginia; 16 jurisdictions declared, None in the PDC
Nov.	1977	Flood; Southwestern Virginia; 8 jurisdictions declared, None in the PDC
July	1979	Flood; Buchanan County declared
Sept.	1979	Flood; Patrick County declared
May	1984	Flood; Buchanan, Dickenson & Washington Counties declared
Nov.	1985	Flood; Western, Central Virginia; 52 jurisdictions declared
Oct.	1989	Flood; Buchanan County declared
April	1992	Flood; Western Virginia; 24 jurisdictions declared, None in the PDC
March	1993	Snowstorm; 43 jurisdictions declared

Aug.	1993	Tornado; Petersburg declared
Feb.	1994	Ice Storm; Central, Western Virginia; 71 jurisdictions declared, None in the PDC
March	1994	Ice Storm; Central, Western Virginia; 29 jurisdictions declared, None in the PDC
June	1995	Flood; Central & Western Virginia; 24 jurisdictions declared
Jan.	1996	Blizzard; All counties and cities in state declared, All localities in PDC declared
Jan.	1996	Flood; 27 jurisdictions declared
Sept.	1996	Hurricane Fran (flooding); 88 jurisdictions declared
Aug.	1998	Hurricane Bonnie (flooding); 5 jurisdictions declared, None in the PDC
Sept.	1999	Hurricane Dennis; Hampton declared, None in the PDC
Sept.	1999	Hurricane Floyd (flooding); 48 jurisdictions declared, None in the PDC
Feb.	2000	Winter Storms; 107 jurisdictions declared, All except Charlottesville and Nelson were declared
July	2001	Flood; Southwestern Virginia; 10 jurisdictions declared, None in the PDC
Sept.	2001	Pentagon Attack; 1 jurisdiction declared, None in the PDC
March	2002	Flood; Southwestern Virginia; 10 jurisdictions declared, None in the PDC
April/May	2002	Flood; Southwestern Virginia; 9 jurisdictions declared, None in the PDC
Feb.	2003	Winter Storms/Flooding; 39 jurisdictions declared, None in the PDC
Sept.	2003	Hurricane Isabel (winds, flooding); 100 jurisdictions declared, All localities in the PDC were declared
Nov.	2003	Flood; Southwestern Virginia; 6 jurisdictions declared
May	2004	Flood; Southwestern Virginia; 3 jurisdictions declared
Sept	2004	Flood; Central Virginia; 12 jurisdictions declared , None in the PDC
October	2004	Severe Storms and Flooding from the remnants of Hurricane Jeanne, None in the PDC declared

Source: FEMA, VDEM

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Hazard Identification and Analysis

201.6(c)(2)(i): The risk assessment shall include a description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Staff and the Working Group performed an identification and analysis of all hazards, with the assistance of University of Virginia planning students. Each of the hazards were identified, including a description of the hazard in *general* written from a national perspective, followed by an in depth analysis based on the *particular* impact the hazard has on the Thomas Jefferson Planning District.

The hazards appear in the order of relative risk posed to the Planning District. The Working Group agreed on the rating for each parameter for all potential hazards, using a risk matrix developed by Kaiser Permanente. Based on the relative threat, the group determined that only flooding, winter storms, hurricanes, tornadoes, and drought posed sufficient threat for detailed analysis. Other hazards do not pose a significant risk and are not discussed in detail.

Some hazards are interrelated (i.e., hurricanes can cause flooding and tornadoes), and some consist of hazardous elements that are not listed separately (i.e., severe thunderstorms can cause lightning; hurricanes can cause coastal erosion). It should also be noted that some hazards, such as severe winter storms, may impact a large area yet cause little damage, while other hazards, such as a tornado, may impact a small area yet cause extensive damage.

Please note that much of the hazard identification sections were adapted from the State of Delaware's Plan Hazard Identification. Unless otherwise noted, dollars are not adjusted for inflation in the tables throughout the hazard analysis.

The complete table showing the Working Group's ratings for all hazards follows:

HAZARDS ASSESSMENT TOOL					
EVENT	**PROBABILITY**	**HUMAN IMPACT**	**PROPERTY IMPACT**	**BUSINESS IMPACT**	**RISK**
	Likelihood this will occur	***Possibility of death or injury***	***Physical losses and damages***	***Interruption of services***	***Relative threat****
SCORE	***0 = N/A 1 = Low 2 = Low-Mod 3 = Moderate 4= Hi-Mod 5=High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 = N/A 1 = Low 2 = Mod 3 = High***	***0 - 100%***
Flooding	5	3	3	2	89%
Blizzards/Icestorms/Winter Storms	5	2	1	2	56%
Hurricanes	3	2	2	2	40%
Tornadoes	2	2	2	2	27%
High Wind / Windstorms	3	2	1	1	27%
Drought	3	0	2	2	27%
Landslides	3	1	1	1	20%
Earthquake	3	1	1	1	20%
Wildfire	2	1	2	1	18%
Dam Failure	1	3	3	2	18%
Extreme Heat	2	2	0	1	13%
Lightning	4	0	1	0	9%
Extreme Cold	1	2	0	1	7%
AVERAGE SCORE	2.64	1.50	1.36	1.29	
		RISK = PROBABILITY * SEVERITY			KAISER PERMANENTE®
		0.24	**0.53**	**0.46**	

Flood

Identification

Flooding is the most frequent and costly natural hazard in the United States, a hazard that has caused more than 10,000 deaths since 1900. Nearly 90 percent of presidential disaster declarations result from natural events in which flooding was a major component.

Floods are generally the result of excessive precipitation, and can be classified under two categories: general floods, precipitation over a given river basin for a long period of time; and flash floods, the product of heavy localized precipitation in a short time period over a given location. The severity of a flooding event is determined by the following: a combination of stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing.

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters, and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

Flash flooding events usually occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces. Flash flood waters move at very high speeds. "Walls" of water can reach heights of 10 to 20 feet. Flash flood waters and the accompanying debris can uproot trees, roll boulders, destroy buildings, and obliterate bridges and roads.

The periodic flooding of lands adjacent to rivers, streams, and shorelines (land known as floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood and the 100-year floodplain by the 100-year flood. Flood frequencies such as the 100-year flood are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given

year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1 percent chance of occurring in any given year.

The table below shows flood damage values by fiscal year from a national perspective.

National Flood Damage by Fiscal Year (Oct-Sep)

Fiscal Year	Damage (Thousands of Current Dollars)	Implicit Price Deflator	Damage (Millions of 1995 Dollars)	U.S. Population (Millions)	Damage Per Capita (1995 Dollars)
1960	111,168	0.22620	491	180.671	2.72
1961	147,680	0.22875	646	183.691	3.51
1962	86,574	0.23180	373	186.538	2.00
1963	179,496	0.23445	766	189.242	4.05
1964	194,512	0.23792	818	191.889	4.26
1965	1,221,903	0.24241	5041	194.303	25.94
1966	116,645	0.24934	468	196.560	2.38
1967	291,823	0.25698	1136	198.712	5.71
1968	443,251	0.26809	1653	200.706	8.24
1969	889,135	0.28124	3161	202.677	15.60
1970	173,803	0.29623	587	205.052	2.86
1971	323,427	0.31111	1040	207.661	5.01
1972	4,442,992	0.32436	13698	209.896	65.26
1973	1,805,284	0.34251	5271	211.909	24.87
1974	692,832	0.37329	1856	213.854	8.68
1975	1,348,834	0.40805	3306	215.973	15.31
1976	1,054,790	0.43119	2446	218.035	11.22
1977	988,350	0.45892	2154	220.239	9.78
1978	1,028,970	0.49164	2093	222.585	9.40
1979	3,626,030	0.53262	6808	225.055	30.25
1980	No data	0.58145	0	227.225	0.00
1981	No data	0.63578	0	229.466	0.00
1982	No data	0.67533	0	231.664	0.00
1983	3,693,572	0.70214	5260	233.792	22.50
1984	3,540,770	0.72824	4862	235.825	20.62
1985	379,303	0.75117	505	237.924	2.12
1986	5,939,994	0.76769	7737	240.133	32.22
1987	1,442,349	0.79083	1824	242.289	7.53
1988	214,297	0.81764	262	244.499	1.07
1989	1,080,814	0.84883	1273	246.819	5.16
1990	1,636,366	0.88186	1856	249.464	7.44
1991	1,698,765	0.91397	1859	252.153	7.37
1992	672,635	0.93619	718	255.030	2.82

Fiscal Year	Damage (Thousands of Current Dollars)	Implicit Price Deflator	Damage (Millions of 1995 Dollars)	U.S. Population (Millions)	Damage Per Capita (1995 Dollars)
1993	16,364,710	0.95872	17069	257.783	66.22
1994	1,120,149	0.97870	1145	260.327	4.40
1995	5,110,714	1.00000	5111	262.803	19.45
1996	6,121,753	1.01937	6005	265.229	22.64
1997	8,934,923	1.03925	8597	267.784	32.11
1998	2,465,048	1.05199	2343	270.248	8.67
1999	5,450,375	1.06718	5107	272.691	18.73
2000	1,336,744	1.08960	1227	282.125	4.35
2001	7,158,700	1.11539	6418	284.797	22.54

Source: National Weather Service

Analysis

Flooding is the most significant hazard in the Thomas Jefferson Planning District, with all localities subject to risk from flash flooding associated with hurricanes and winter storms, as well as riverine flooding of the James, Rivanna, and Conway Rivers.

Albemarle County
The James River floods in some manner nearly every year. The areas most prone to flooding in Albemarle County are the James River corridors and tributaries, and the steep slopes of the Blue Ridge Mountains along the western edge of the county. Scottsville, Howardsville and Sugar Hollow have experienced frequent flooding. A levee was built in 1989 and effectively protects the Town of Scottsville from further flood damage. A flood in 1913 resulted in water depths of 25 feet.

Before the levee was built in Scottsville

Markings show the height of past floods

Fluvanna County
The James River in Fluvanna County floods with some regularity, particularly in the Town of Columbia, located at the confluence of the Rivanna and James Rivers. At times, floods have

covered 50% of the Town. The historic C&O depot was moved out of the floodplain to be used as a community center. The small community of Bremo, located in the southern part of the county, is also at risk of flooding. Hurricane Camille in 1969 filled Lake Monticello, a 350-acre man-made lake, overnight, but the dam now protects residents from future floods. The portion of Scottsville in Fluvanna County is not behind the levee.

The James and Rivanna Rivers converge in Columbia

Greene County
Major rain events threaten the county annually, and hurricanes and their remnants are probable in late summer. Winter storms also contribute to flooding. The slopes of the Blue Ridge Mountains are at the highest risk for flash floods. The town of Stanardsville is protected from flooding by its elevation.

Louisa County
Hurricane Camille in 1969 filled Lake Anna and destroyed the dam at Lake Louisa. The Towns of Louisa and Mineral sit on high ground and are generally not affected by flooding, other than flooding due to poor stormwater drainage. Dam controls protect residential development around Louisa's lakes.

Nelson County
The James River in Nelson County floods in some manner nearly every year. The slopes of the Blue Ridge Mountains are at the highest risk for flash floods. Howardsville, Wingina, Norwood, Gladstone, Schuyler, Nellysford and Woods Mill are populated areas experiencing frequent flooding. During Hurricane Camille in Nelson County, rocks, trees and landslides created temporary dams in the mountain hollows. When these dams broke, devastating flooding occurred, destroying everything in its path.

Summary of Floods

Flood Record 1993 - 2003					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	28	1	0	$336,000	$900,000
Fluvanna	5	0	0	$10,000	0
Greene	25	4	1	$17,141,000	$361,000
Louisa	8	0	0	$71,000	0
Nelson	25	0	0	$1,296,000	$50,000

Source: National Climate Data Center

Notable Flood Events in the Planning District (1993-2003)

Event	Location	Damage	Date
Albemarle			
Flash Flood	Albemarle Southern		July 3, 2003
Flood	Albemarle	$100,000 property damage	Feb 22, 2003
Flash Flood	Albemarle		July 23, 2002
Flash Flood	Albemarle Northern		June 18, 2002
Flash Flood	Albemarle Southern		May 27, 2002
Flash Flood	Albemarle Northwest		Sept 3, 2000
Flash Flood	Albemarle		June 27, 2000
Flash Flood	Albemarle Free Union		Sept 29, 1999
Flash Flood	Albemarle		Sept 9, 1999
Flash Flood	Albemarle		Sept 5, 1999
Flood	Albemarle Western		March 20, 1998
Flood	Albemarle		Feb 4, 1998
Flood	Albemarle Northern		Jan 28, 1998
Flash Flood	Albemarle Western		Jan 8, 1998
Flash flood (Hurricane Fran)	Albemarle, Greene, Nelson	$78,700,000 property damage $26,800,000 crop damage	Sept 6, 1996
Flash Flood	Albemarle Southwest	$10,000 property damage	June 19, 1996
Flash Flood	Albemarle	1 death	Jan 19, 1996
Flash Flood	Albemarle Eastern		Nov 11, 1995
Flash Flood	Albemarle		July 6, 1995
Flood/flash flood	Rt. 614 Alb. Co. (Sugar Hollow).	$1,900,000 property damage $250,000 crop damage problems with wells & septic tanks	June 27, 1995
Flash Flood	Albemarle Northeast		June 25, 1995
Flood	Albemarle	$1,000 property damage	June 25, 1994
Flood	Albemarle	$5,000 property damage	Aug 17, 1993
Charlottesville			
Flash Flood	Charlottesville		July 28, 2000

Flash Flood	Charlottesville		Sept 5, 1999
Flash Flood	Charlottesville		June 23, 1998
Flood	Charlottesville		May 8, 1998
Fluvanna			
Flood	Fluvanna		March 20, 2003
Flood	Fluvanna		Jan 19, 1996
Flash Flood	Fluvanna Central/East		June 27, 1995
River Flood	Fluvanna Bremo	$5,000 property damage	Jan 17, 1995
Flash Flood	Fluvanna	$5,000 property damage	March 4, 1993
Greene			
Flash Flood	Greene	$5,000 property damage	March 4, 2003
Flood	Greene	$100,000 property damage	Feb 22, 2003
Flash Flood	Greene		Jun 18, 2002
Flash Flood	Greene		Aug 12, 2001
Flash Flood	Greene		Sept 9, 1999
Flood	Greene	$10,000 property damage	March 20, 1998
Flood	Greene	$2,000 property damage	Feb 17, 1998
Flood	Greene	$5,000 property damage	Feb 4, 1998
Flood	Greene		Jan 28, 1998
Flood	Greene	$3,000 property damage	Jan 23, 1998
Flash Flood	Greene	$10,000 property damage	Jan 8, 1998
Flash Flood	Greene	$5,000 property damage	July 1, 1997
Flash Flood	Greene	$20,000 property damage	Sept 8, 1996
Flash Flood	Greene	$10,000 property damage	Sept 4, 1996
Flood	Greene	$15,100,000 property damage $81,000 crop damage 4 deaths	Jan 19, 1996
Flash Flood	Greene		Oct 5, 1995
Flash Flood	Greene (Dyke)	$250,000 property damage	Jun 27, 1995
Flash Flood	Greene	$1,000 property damage	Aug 17, 1994
Flash Flood	Greene		Feb 29, 1999
Louisa			
Flash Flood	Louisa (Gum Spring)		Aug 16, 2003
Flash Flood	Louisa Boswells Tavern		June 14, 2003
Flash Flood	Louisa Trevilians		Mar 20, 2003
Flash Flood	Louisa Mineral		Aug 4, 2000
Flash Flood	Louisa (Ware's Xrd)		Oct 18, 1996
Flash Flood	Louisa western	$65,000 property damage	June 27, 1995
Flash Flood	Louisa	$1,000 property damage	Aug 17, 1994
Flash Flood	Louisa	$5,000 property damage	March 4, 1993
Nelson			
Flash flood	Nelson		July 6, 2003
Flash flood	Nelson Lovingston		June 11, 2003
Flood	Nelson	$100,000 property damage	Feb 22, 2003
Flash flood	Nelson Shipman		Aug 3, 2002
Flash flood	Nelson Lovingston		June 22, 2001
Flash flood	Nelson		Sept 2, 2000
Flash flood	Nelson	40,000 property damage	Sept 29, 1999
Flash flood	Nelson	$15,000 property damage	Sept 9, 1999
Flash flood	Nelson		Sept 5, 1999

Flash Flood	Nelson	$10,000 property damage	Jan 8, 1998
Flash Flood	Nelson Eastern		July 24, 1997
Flash Flood	Nelson	5,000 property damage	Oct 20, 1995
Flash Flood	Nelson	$50,000 property damage	Jan 15, 1995
Flash Flood	Nelson	$1000 property damage	Aug 17, 1994
Flash Flood	Nelson	$5,000 Property Damage	March 4, 1993

Source NOAA, NCDC, Historical Society (newspapers)

Data Disclaimer: In all tables where NCDC is listed as the primary source, it is possible that data is reported with other localities, resulting in a value that is neither different nor exclusive. NCDC, like the TJPDC uses best available data. NCDC provides this disclaimer:

> Storm Data Disclaimer:
>
> Storm Data is an official publication of the National Oceanic and Atmospheric Administration (NOAA) which documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. Some information appearing in Storm Data may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS. Therefore, when using information from Storm Data, customers should be cautious as the NWS does not guarantee the accuracy or validity of the information. Further, when it is apparent information appearing in Storm Data originated from a source outside the NWS (frequently credit is provided), Storm Data customers requiring additional information should contact that source directly. In most cases, NWS employees will not have the knowledge to respond to such requests. In cases of legal proceedings, Federal regulations generally prohibit NWS employees from appearing as witnesses in litigation not involving the United States.

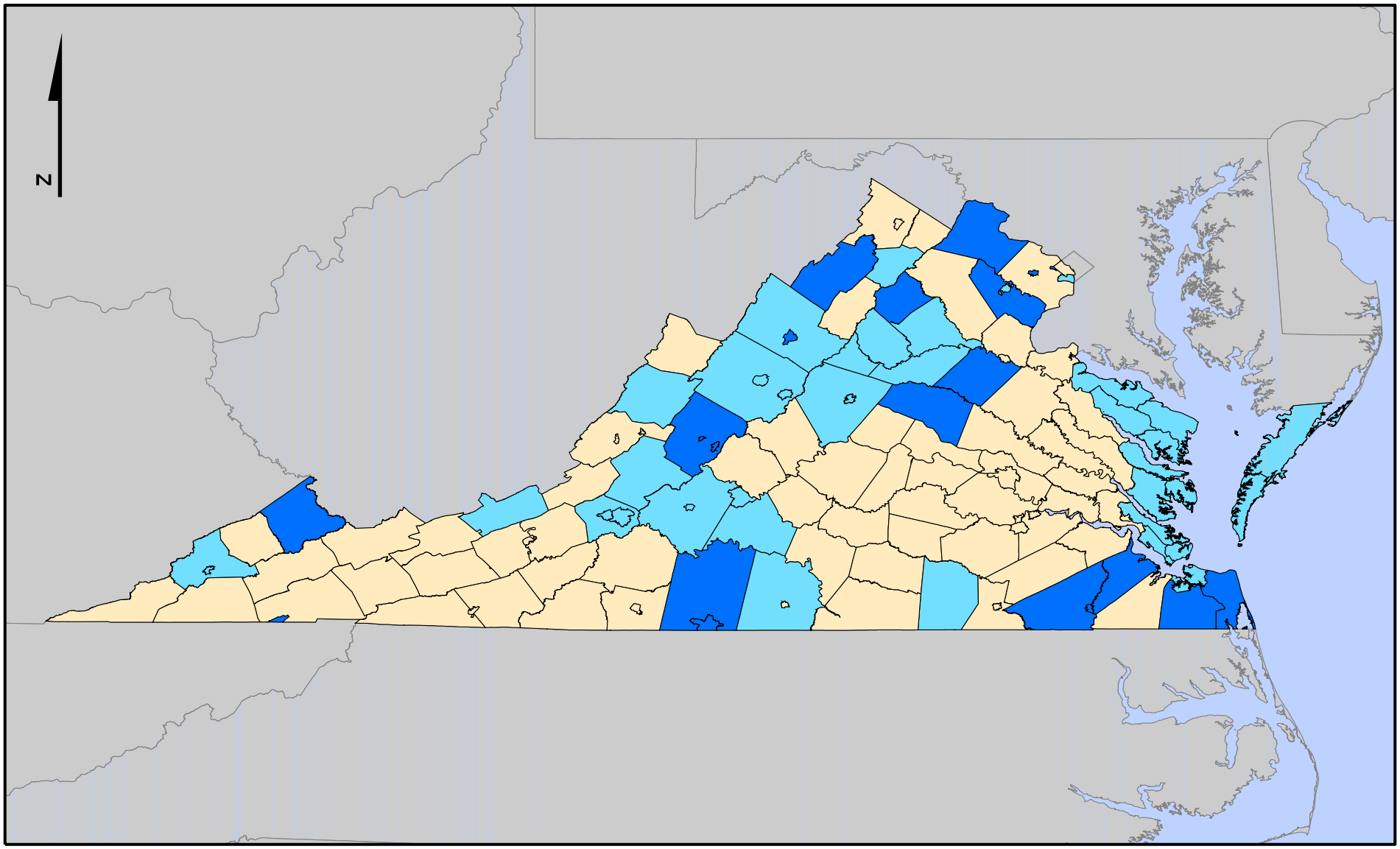
100-year Floodplains in the TJPD

100-year Floodplain

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 30, 2004 C:\GIS\HMP\Floodplains

VIRGINIA FLOODPLAIN MAP FORMAT STATUS 2004



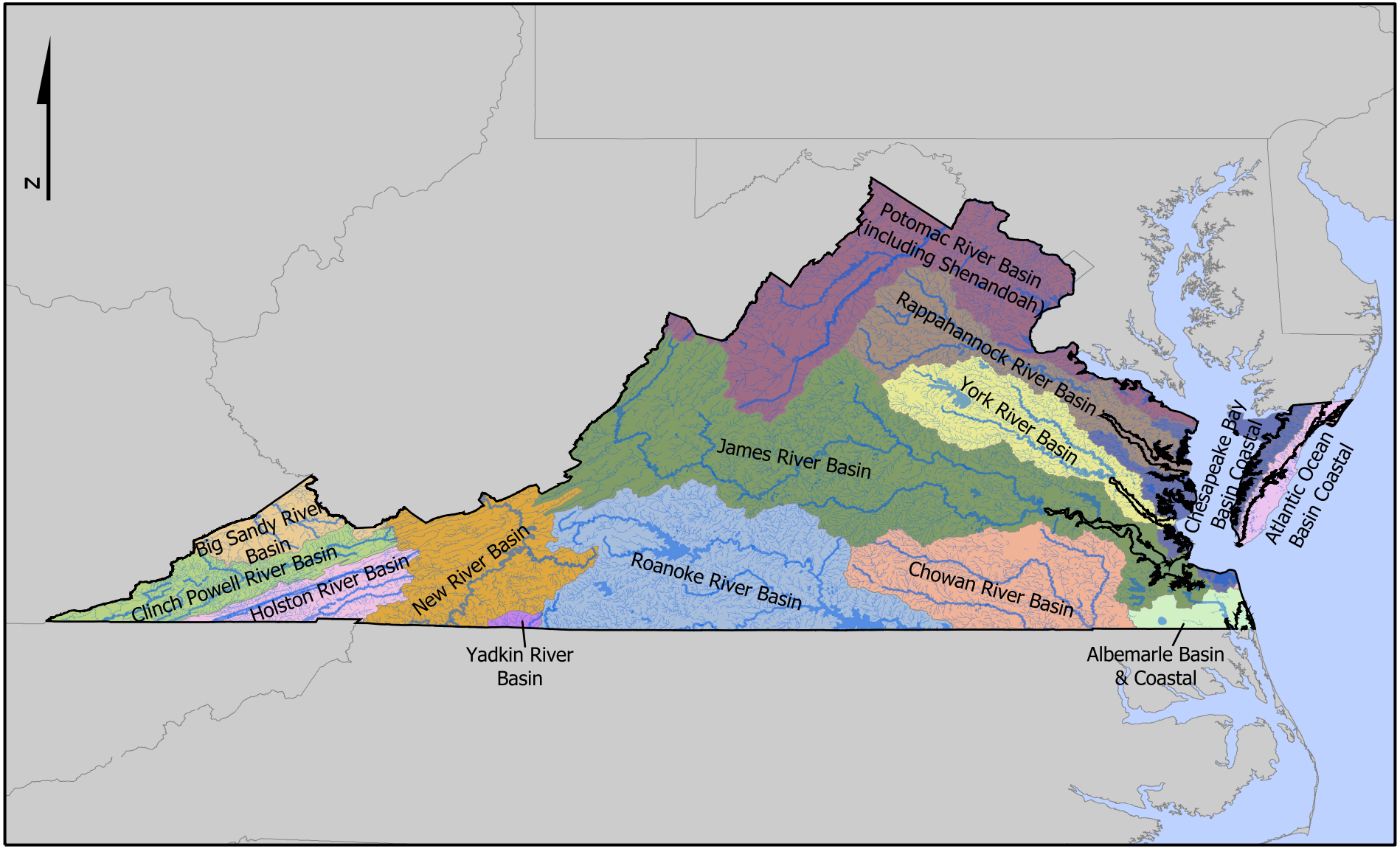
DFIRM (21) Q3 (44) Paper FIRM (71)

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: February 2004

Data Sources: FEMA Digitial and Paper Flood Maps, Nikki Roberts with FEMA Region III, VT CGIT

MAJOR WATERSHEDS OF VIRGINIA



Albemarle Basin & Coastal
Atlantic Ocean Basin Coastal
Big Sandy River Basin
Chesapeake Bay Basin Coastal
Chowan River Basin
Clinch Powell River Basin
Holston River Basin
James River Basin
New River Basin
York River Basin
Potomac River Basin - including Shenandoah
Rappahannock River Basin
Roanoke River Basin
Yadkin River Basin

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

Map prepared by Virginia Tech Center for Geospatial Information Technology
Date: February 2004
Data Sources: Virginia Department of Conservation and Recreation, VT CGIT

Severe Winter Storms and Extreme Cold

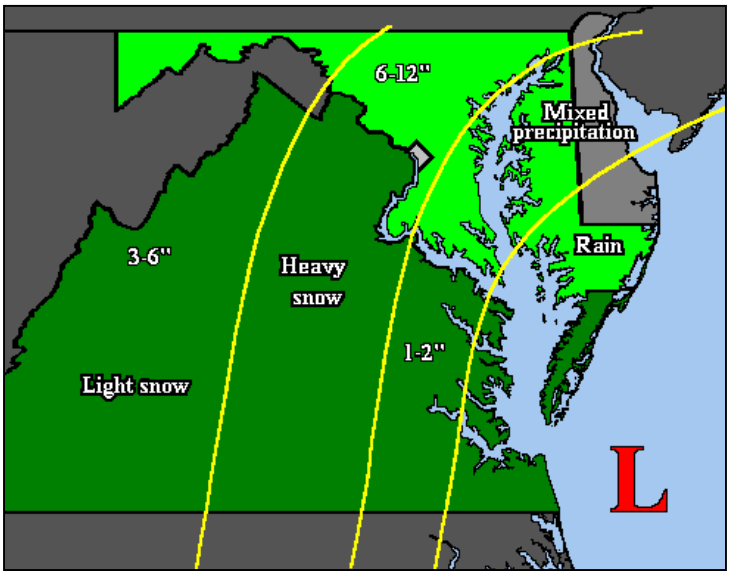
Identification

A winter storm can range from a moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Some winter storms may be large enough to affect several states, while others may affect only a single community. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility.

Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Sleet—raindrops that freeze into ice pellets before reaching the ground—usually bounces when hitting a surface and does not stick to objects; however, sleet can accumulate like snow and cause a hazard to motorists. Freezing rain is rain that falls onto a surface with a temperature below freezing, forming a glaze of ice. Even small accumulations of ice can cause a significant hazard, especially on power lines and trees. An ice storm occurs when freezing rain falls and freezes immediately upon impact. Communications and power can be disrupted for days, and even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

A freeze is weather marked by low temperatures, especially when below the freezing point (zero degrees Celsius or thirty-two degrees Fahrenheit). Agricultural production is seriously affected when temperatures remain below the freezing point.

Analysis

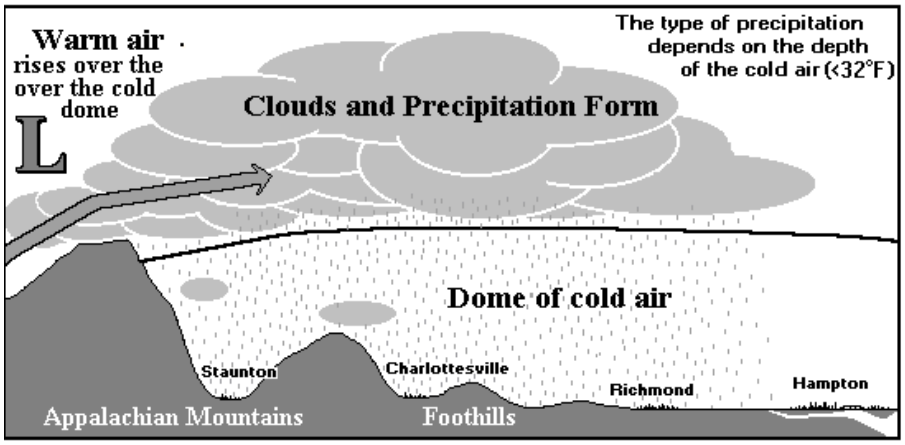


Heavy Snow: Virginia's biggest winter storms are the great "Nor'easters". These storms occur when arctic air flows from New England into Virginia. Cold dry air becomes trapped to the east of the Appalachian Mountains, funneling down the valleys and along the coastal plain toward North Carolina. When the cold air meets warm air over the Gulf Stream, storms can develop rapidly, creating "white hurricanes".

The storm's speed and exact track to the north are critical in properly forecasting and warning for heavy snow across Virginia. It is quite

common for the rain-snow line to fall roughly 50 miles east of the Planning District. Heavy snow often falls in a narrow 50 mile wide swath about 150 miles northwest of the low pressure center (see diagram above). Closer to the low center, the warmer ocean air changes the precipitation over to sleet, freezing rain, and eventually rain.

Heavy snow can block roadways and waterways, cause tree and utility damage, and lead to structural damage, such as collapsed roofs on large buildings.



Ice Storms: Ice storms are a fairly common event in the valleys and foothills of the Appalachian Mountains, but are generally limited to one or two per year when they occur. During the winter of 1993-1994, Virginia was struck by an unprecedented series of ice storms. Utility company records show the frequency with which fallen wires need to be repaired. The set up is similar to that of a nor'easter (see diagram above).

Damage from ice storms can be extensive. Ice on roadways and walkways can lead to serious traffic wrecks and slip and fall injuries. Ice accumulated on trees and utility wires can cause them to break, knocking out power and communication lines. Structural damage can also occur to buildings and communication towers. During the February 10-11, 1994 ice storm, some areas of southern Virginia received 3 inches of ice causing extensive tree damage and weeklong power outages. All of the localities in the Thomas Jefferson Planning District are affected by severe winter storms every year, with the severity and extent varying year to year.

Source: *Virginia Winters: Snow, Wind, Ice and Cold* by Barbara McNaught Watson (www.vaemergency.com/library/vawinter/va-win.htm).

Extreme Cold: Extremely cold temperatures have also caused some damage in the Thomas Jefferson Planning District, particularly crop damage. In January 1994, temperatures reached -15°F, damaging peach crops. In April 1997, $18 million in crop damage was reported due to extremely cold weather. Temperatures of -30°F were reported in February of 1899. *Source: NCDC, Albemarle Historical Society archived newspapers.*

Summary of Winter Storms

Winter Storm Record from 1993-2003					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	41	2	51	$9,385,000	$1,200,000
Fluvanna	33	0	2	$20,565,000	$15,000
Greene	42	4	52	$9,436,000	$1,275,000
Louisa	34	0	2	$20,565,000	$15,000
Nelson	34	1	1	$9,385,000	$1,200,000

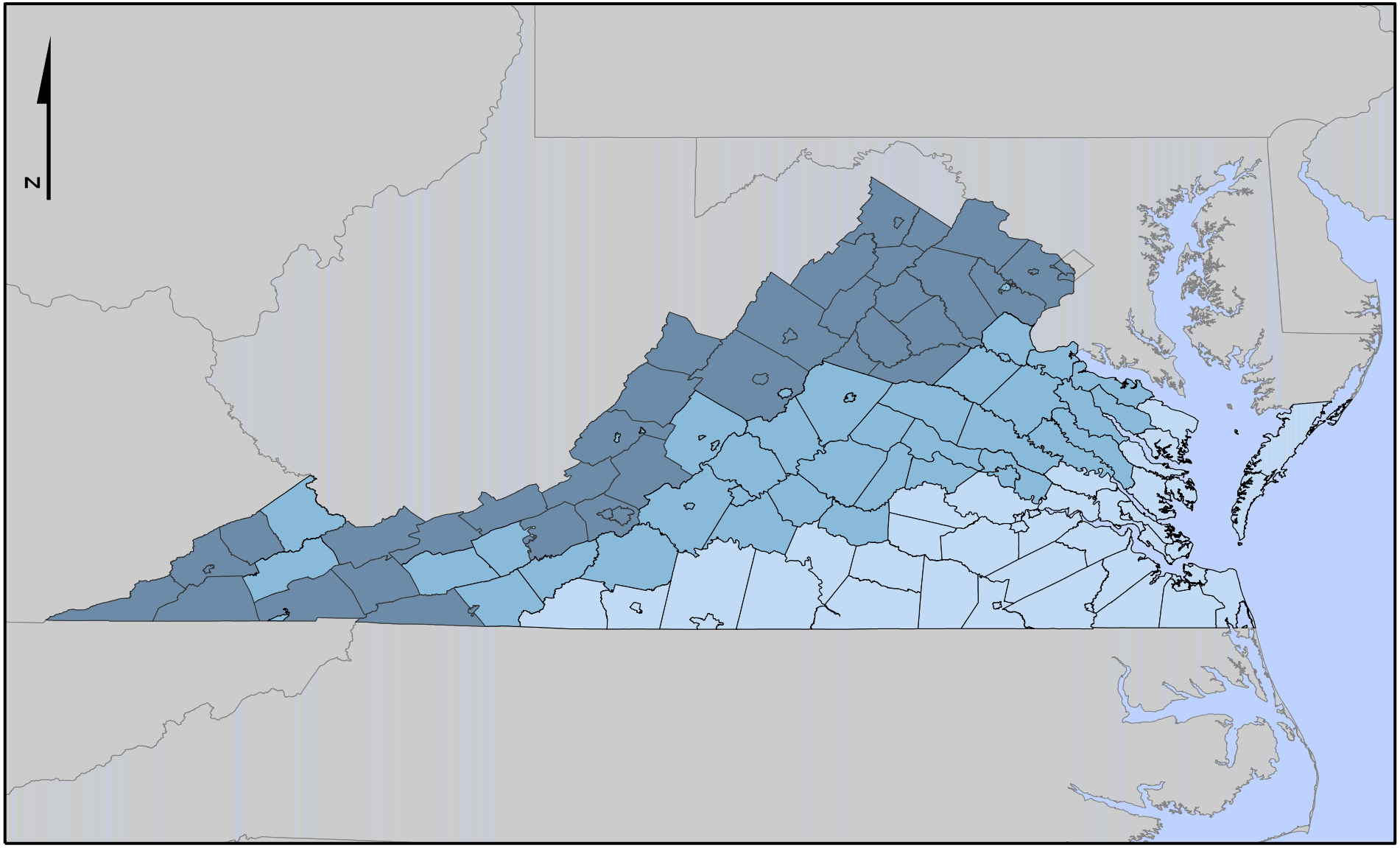
Source: National Climate Data Center

Notable Winter Storms in the Planning District

Event	Damage	Date
Winter Storm	$8.9 Million property damage, 1 death	Feb 14, 2003
Ice Storm	$465,000 property damage, 2 injuries	Jan 30, 2000
Ice Storm	$125,000 property damage, $1.2 million crop damage	Feb 4, 1998
Ice Storm	$20 million property damage	Dec 12, 1998
Heavy Snow	$350,000 property damage, 1 injury	Jan 12, 1996
Blizzard (Presidential Disaster Area)	$250,000 property damage, 1 death, 1 injury	Jan 6, 1996

Source: NCDC

WINTER STORM SEVERITY FOR VIRGINIA

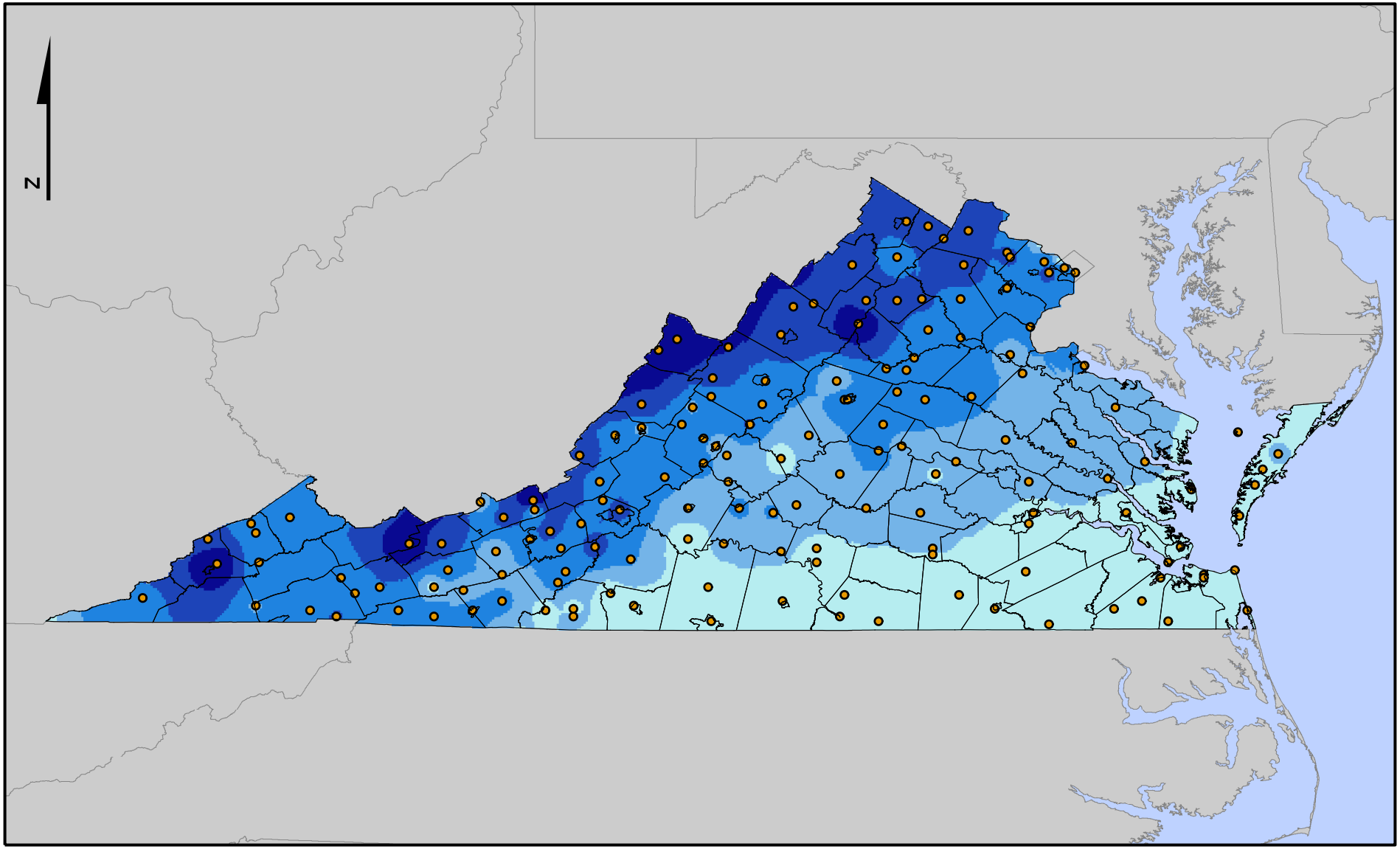


Low Severity
Medium Severity
High Severity

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

Map prepared by Virginia Tech Center for Geospatial Information Technology
Date: February 2004
Data Sources: NOAA snowfall records VT CGIT

VIRGINIA SNOWFALL (inches)



Weather Stations

2.65 - 10.69

10.69- 16.12

16.12- 21.55

21.55 - 29.37

29.37 - 58.26

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: July 2004

Data Sources: NOAA Snowfall Records, SE Regional Climate Center, VT CGIT

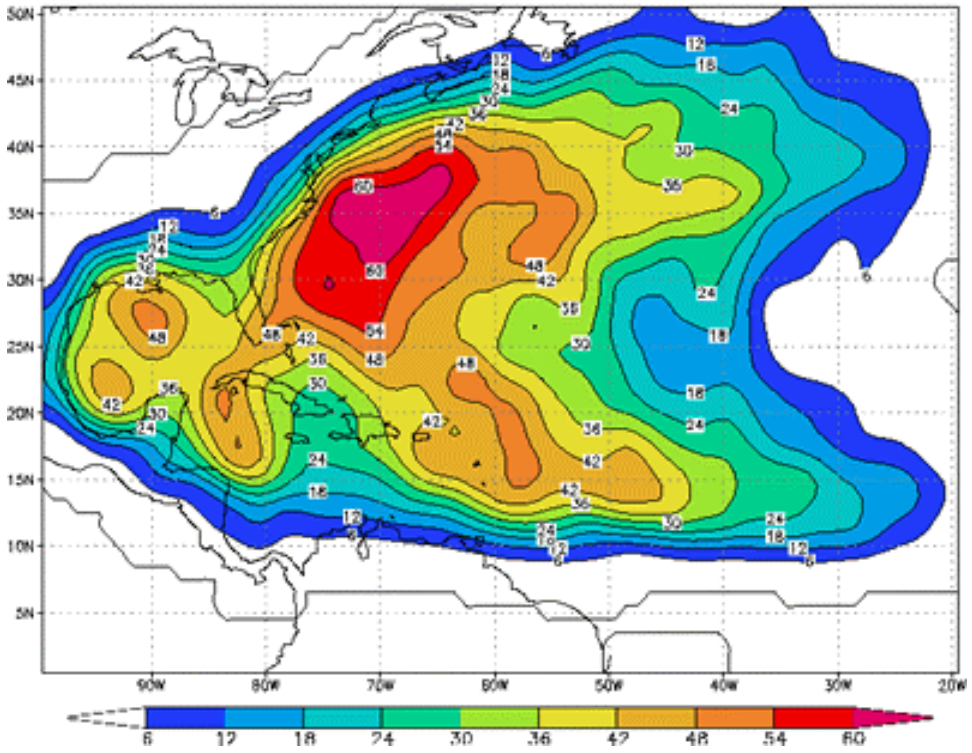
Hurricanes

Identification

Hurricanes, tropical storms, nor'easters, and typhoons, also classified as cyclones, are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves, and tidal flooding which can be more destructive than cyclone wind.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in this basin is about six (6).

Empirical Probability of a Named Storm



As an incipient hurricane develops, barometric pressure (measured in Millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale, which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

The Saffir-Simpson Scale is shown below.

Saffir-Simpson Scale

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
1	74—95	Greater than 980	3—5
2	96—110	979—965	6—8
3	111—130	964—945	9—12
4	131—155	944—920	13—18
5	155+	Less than 920	19+

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes, and while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. The table below describes the damage that could be expected for each category of hurricane.

Hurricane Damage Classification

Category	Damage Level	Description
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain may be flooded well inland.
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.

Source: National Hurricane Center

A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to 20 feet in a Category 5 storm. The storm surge arrives ahead of the storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Water rise can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas. A storm surge is a wave that has outrun its generating source and become a long period swell. The surge is always highest in the right-front quadrant of the direction in which the hurricane is moving. As the storm approaches shore, the greatest storm surge will be to the north of the hurricane eye. Such a surge of high water topped by waves driven by hurricane force winds can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast.

Damage during hurricanes may also result from spawned tornadoes and inland flooding associated with heavy rainfall that usually accompanies these storms. Hurricane Floyd, as an example, was at one time a Category 4 hurricane racing towards the North Carolina coast. As far

inland as Raleigh, the state capital located more than 100 miles from the coast, communities were preparing for extremely damaging winds exceeding 100 miles per hour. Floyd made landfall as a Category 2 hurricane and will be remembered for causing the worst inland flooding disaster in North Carolina's history. Rainfall amounts were as high as 20 inches in certain locales and 67 counties sustained damages.

Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their associated strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful.

Analysis

Hurricanes have affected every locality in the planning district in many different forms over time. Hurricanes produce a variety of hazards, including flash flooding, riverine flooding, high winds, and sometimes spawn tornados and landslides. Modern communications make tracking and warning for these storms much easier, allowing people to prepare for the event in advance. However, spot damage can be quite extensive and may catch some by surprise, with no opportunity for advance preparation.

The most severe and remembered was Hurricane Camille, which in 1969 devastated much of the planning district. Camille produced torrential rains in the remote mountains of Nelson County, Virginia. In just 12 hours, the mountain slopes between Charlottesville and Lynchburg received over 10 inches of rain. Nelson County recorded almost 30 inches of rainfall within 4 ½ hours. The flooding was so catastrophic that all communications were cut off. Although the eye of Hurricane Camille did not actually pass through Nelson County, the resulting rainfall proved to be devastating. As a result of the deluge of water flowing from the water-soaked mountainsides, massive landslides occurred which swept tons of soil, boulders, and thousands of trees onto farmlands, highways, floodplains and into the normal streambed and banks of almost every stream in the area. Over 150 people died in Virginia as a result of Hurricane Camille and another 100 were injured. Damage was estimated at 113 million dollars (1969 dollars).

Since 1871, 123 hurricanes and tropical storms have affected Virginia taking 228 lives and costing the Commonwealth over a billion dollars in damages. The eye or center of 69 tropical cyclones tracked directly across Virginia. Virginia averages one storm a year, with no storms some years and multiple storms in rapid succession in others.

The following maps demonstrate the lack of pattern and predictability of the paths of historic hurricanes.

Source: *Virginia Hurricane* (article) by Barbara McNaught Watson, as well as *Flood Disaster Review and Analysis: Nelson County, Virginia* and local sources.

Summary of Hurricanes

Hurricane Record (1954 - 2003)					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	0	0	0	0	0
Fluvanna (reported with Louisa)	1	3	0	$45,070,000	$7,140,000
Greene	0	0	0	0	0
Louisa (reported with Fluvanna)	1	3	0	$45,070,000	$7,140,000
Nelson	0	0	0	0	0

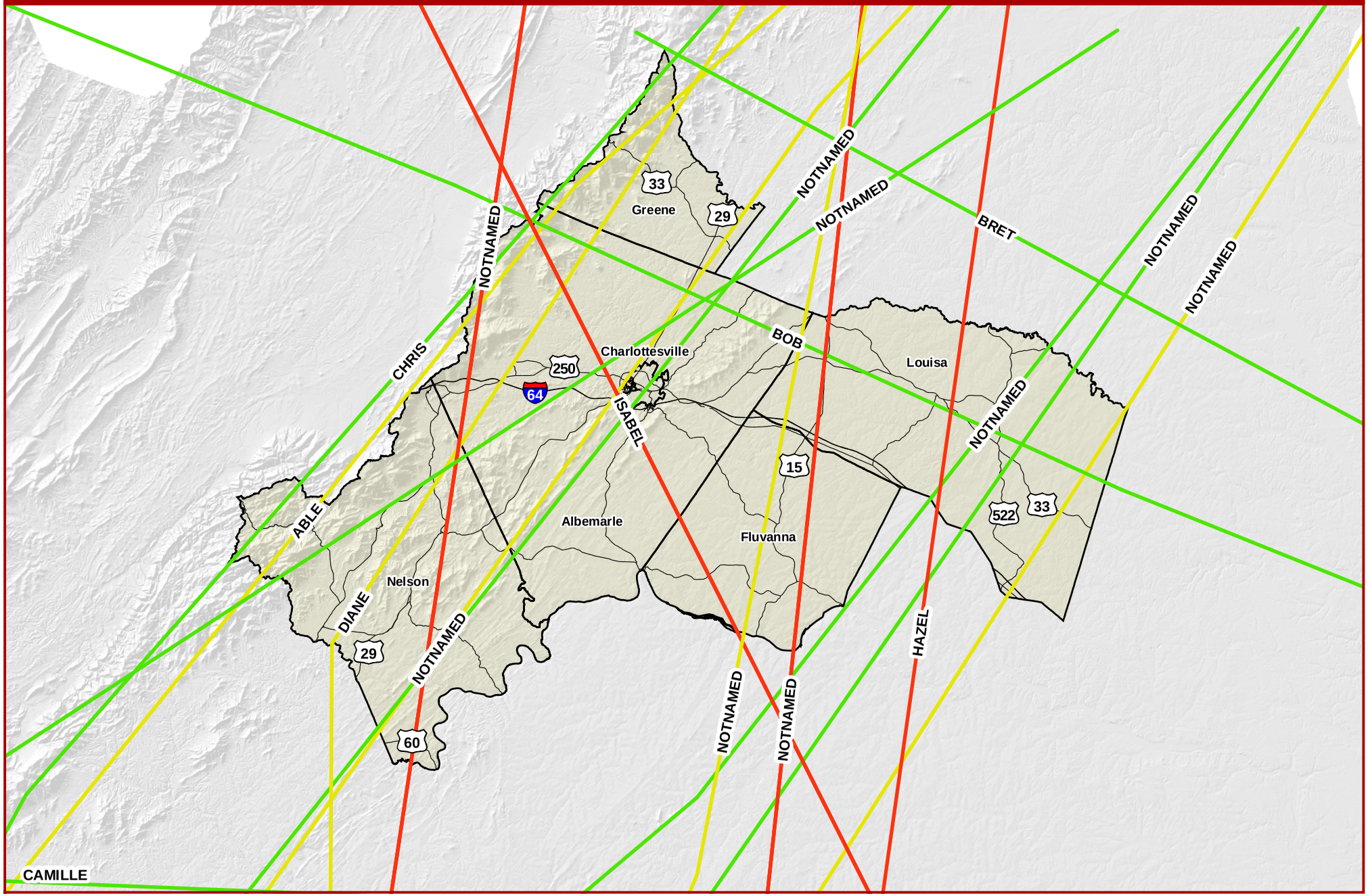
Source: National Climate Data Center

Notable Hurricanes in the Planning District

Hurricane	Specific Area	Damage	Year	Category
Isabel		Preliminary estimate of over $4 billion in damages/costs; at least 40 deaths	Sept 18, 2003	5
Floyd		Flooding rains and high winds. 4 deaths; over 280,000 customers without electricity, 5,000 homes damaged.	Sept 14-18, 1999	4
Fran	Northwest Greene Co. was hardest hit.	$5.8 billion damage; 37 deaths, loss of electricity (state-wide)	Sept 5, 1996	3
Agnes	Scottsville (34 feet), Howardsville and Columbia	More than 210,000 people were forced to flee for their lives and 122 were killed.	June 19-24, 1972	1
Camille	Worst affected communities Massie Mill, Davis Creek, Scottsville, Howardsville, Schuyler, Columbia, Piney River	114 deaths in Nelson Co alone. Flooding & landslides. $1.42 billion (unadjusted).	August 1969	5
Hazel		Flooding, barns leveled, roofs pulled off.	Oct 14-15, 1954	4

Source: National Weather Service, Albemarle County Historical Society

Hurricane Tracks in the TJPD: 1851-2003



Tropical Depression (17 - 38 mph)
Tropical Storm (39 -73 mph)
Category 1 (74 - 95 mph)

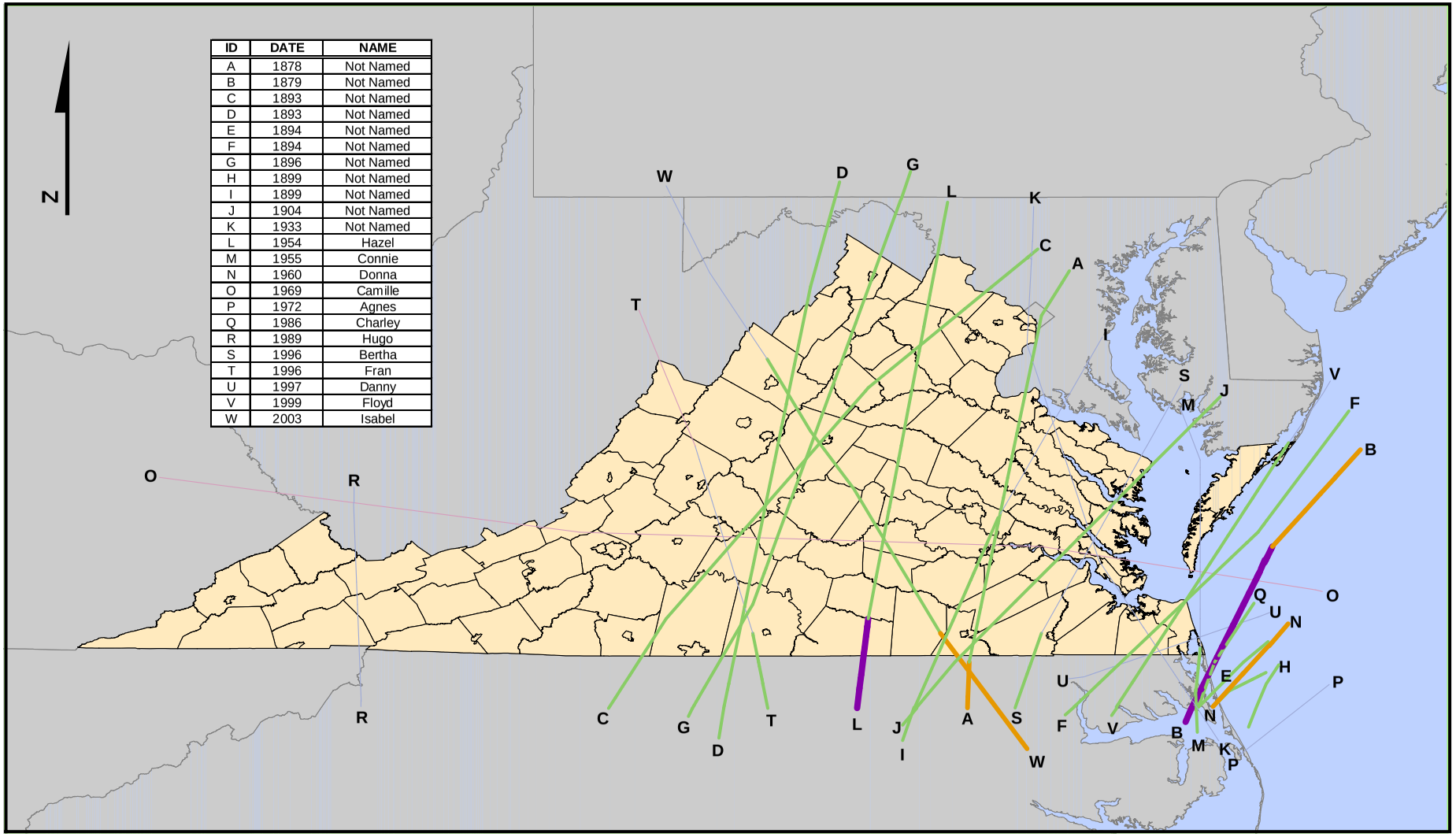
Saffir-Simpson Scale

Thomas Jefferson Planning District Commission

Map is for general planning and illustration purposes only. The information contained in this map is not to be construed or used as a legal description.
January 03, 2005 C:\GIS\HMP\Landslides.mxd
Data Source: NOAA Coastal Sevices Center

HURRICANE TRACKS IN VIRGINIA 1851-2003

ID	DATE	NAME
A	1878	Not Named
B	1879	Not Named
C	1893	Not Named
D	1893	Not Named
E	1894	Not Named
F	1894	Not Named
G	1896	Not Named
H	1899	Not Named
I	1899	Not Named
J	1904	Not Named
K	1933	Not Named
L	1954	Hazel
M	1955	Connie
N	1960	Donna
O	1969	Camille
P	1972	Agnes
Q	1986	Charley
R	1989	Hugo
S	1996	Bertha
T	1996	Fran
U	1997	Danny
V	1999	Floyd
W	2003	Isabel



Tropical Depression (17-38 mph)

Tropical Storm (39 - 73 mph)

Category 1 (74 - 95 mph)

Category 2 (96 - 110 mph)

Category 3 (111 - 126 mph)

*Saffir-Simpson Hurricane Scale

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: April 2004

Data Sources: Tropical Storm History USGS, National Weather Service Tropical Prediction Center
National Hurricane Center

Tornadoes

Identification

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other coastal storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2002). They are more likely to occur during the spring and early summer months of March through June and can occur at any time of day, but are likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light construction such as residential homes (particularly mobile homes), and tend to remain localized in impact. The Fujita-Pearson Scale for Tornadoes was developed to measure tornado strength and associated damages.

Fujita-Pearson Scale for Tornadoes

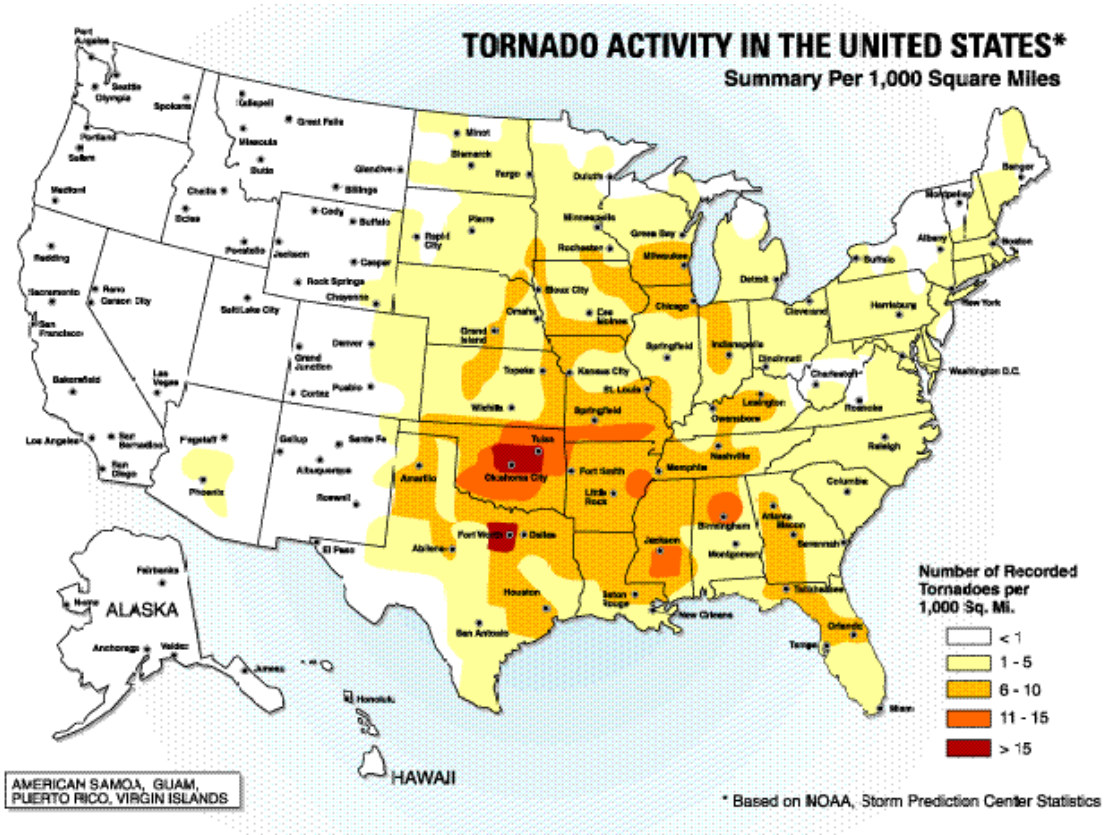
F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F0	Gale tornado	40-72 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	Moderate tornado	73-112 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	Devastating tornado	207-260 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F5	Incredible tornado	261-318 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 MPH	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

Source: The Tornado Project, 2002.

According to the NOAA Storm Prediction Center (SPC), the highest concentrations of tornadoes in the United States have been in Oklahoma, Texas, Kansas and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of "tornado alley"), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002).

The figure below shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.



Source: American Society of Civil Engineers

Analysis

Virginia experiences an average of seven tornadoes per year. Many occur in unpopulated areas or cause little property damage and therefore are not reported to the National Weather Service. Since 1916 (when tornado-related fatality recordkeeping began) 65 people have died from tornadoes in Virginia. A third of these deaths occurred during a Virginia's worst tornado outbreak on May 2, 1929. The most recent tornado activity in the Planning District took place in September 2004 with Hurricane Ivan. While these tornadoes did cause some damage, the extent has not yet been reported by the National Climate Data Center.

Tornado touching down on Route 29

July is the most active month for tornadoes in Virginia, since it has the most thunderstorms, but no tornado deaths have occurred in Virginia in July since tornadoes spawned by afternoon storms tend to be weak (89% are F0 or F1). Tornado deaths in Virginia peak in the late spring and fall, when tornadoes that occur tend to be stronger, spawned by severe winter storms and hurricanes.

Source: *Virginia Tornadoes by Barbara McNaught Watson, www.vdem.state.va.us/library/vatorn/va-tors.htm.*

Summary of Tornadoes

Tornado Record 1959-June 2004					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	7	11	4	$250,000	0
Fluvanna	4	0	0	$260,000	0
Greene	4	1	9	$302,000	0
Louisa	7	0	0	$783,000	0
Nelson	1	0	0	$8,000	0

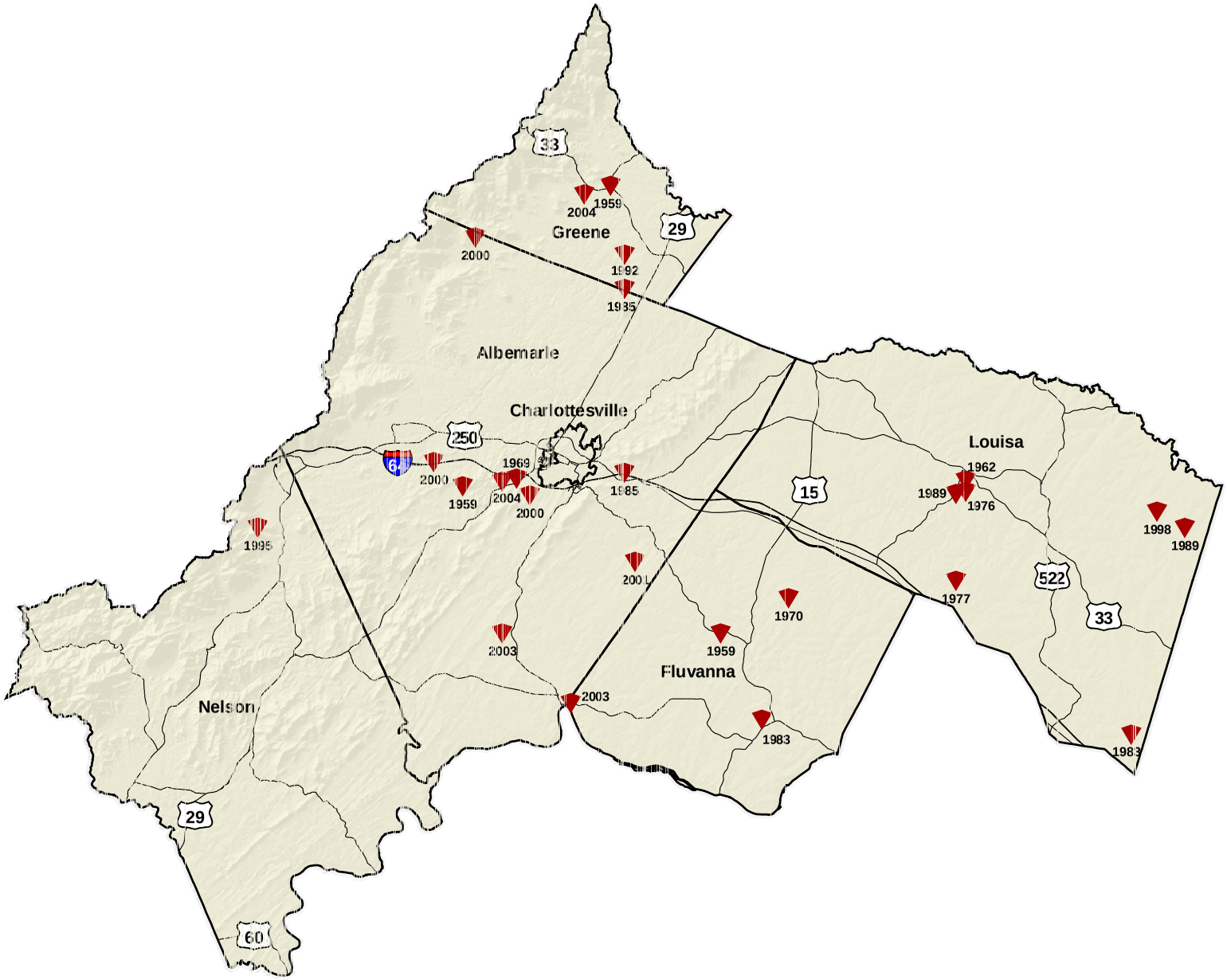
Source: National Climate Data Center

Notable Tornadoes in the Planning District

Class	Damage	Date
F1	wind, large hail, frequent lightning, heavy downpours, downed trees, blew out glass in shopping center, damaged homes, downed power lines and telephone poles $500,000 property damage	May 13, 2000
F1	$250,000 property damage	May 5, 1989
F3	$250,000 property damage	July 25, 1985
F1	$250,000 property damage	October 13, 1983
F2	$250,000 property damage	August 9, 1962
N/A	11 people died in Ivy/Mechum's River	1959
N/A	Leveled trees, tore off roofs, smashed buildings in Ivy	1922

Source: NCDC, Albemarle Historical Society archived newspapers

Tornado Events in the TJPD: 1959-2004

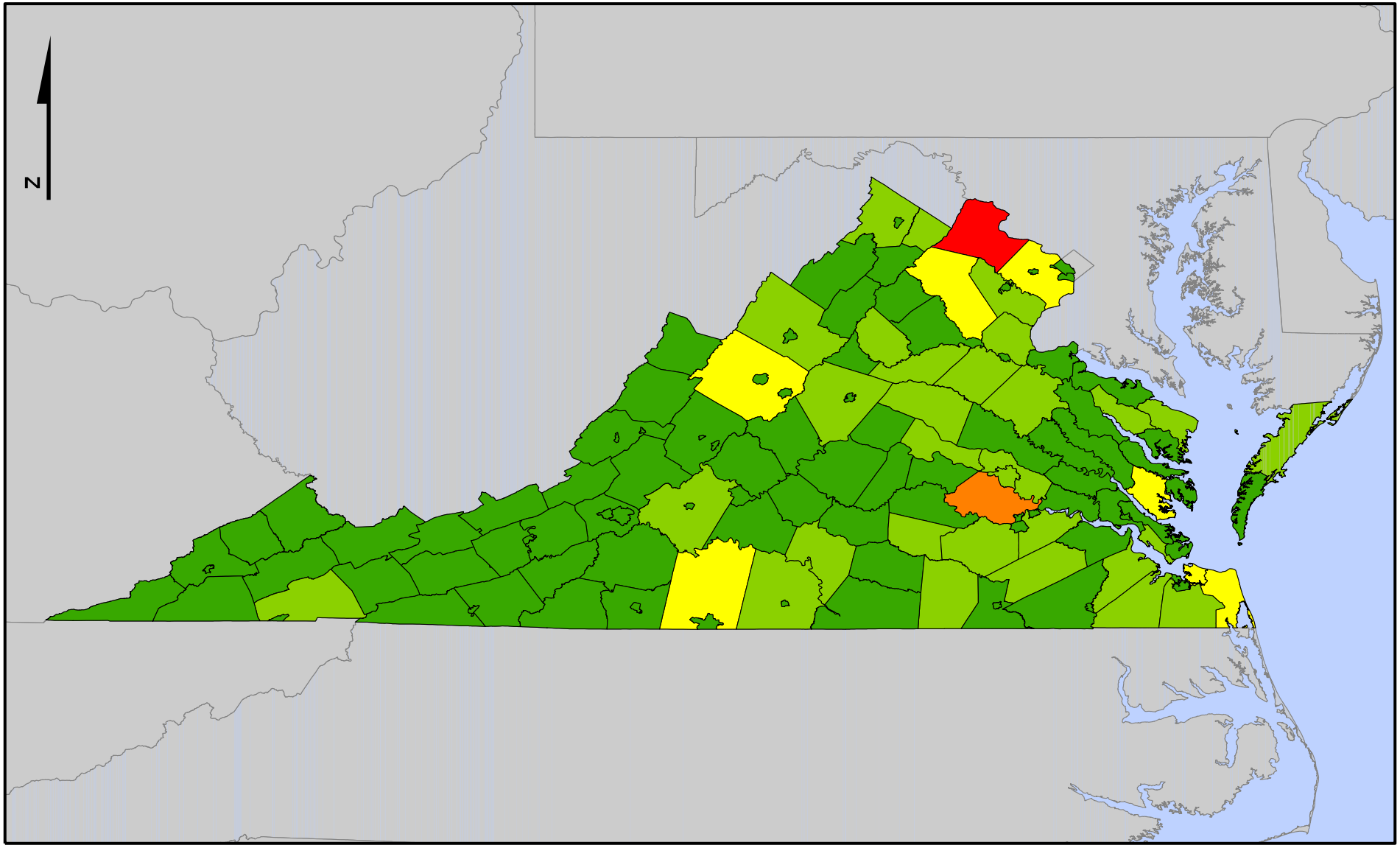


Tornado

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 28, 2004 C:\GIS\HMP\Tornadoes.mxd

TORNADO TOTALS IN VIRGINIA



Tornado Totals (number of Counties)

- 0 - 4 (97)
- 5 - 8 (30)
- 9 - 12 (7)
- 13 - 16 (1)
- 17 - 20 (1)

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: February 2004

Data Sources: NOAA tornado database, VT CGIT

High Winds and Thunderstorms

Identification

High Winds: The figure below shows how the frequency and strength of extreme windstorms vary across the United States. The map was produced by the Federal Emergency Management Agency and is based on 40 years of tornado history and over 100 years of hurricane history. Zone IV, the darkest area on the map, has experienced both the greatest number of tornadoes and the strongest tornadoes. As shown by the map key, wind speeds in Zone IV can be as high as 250 MPH.

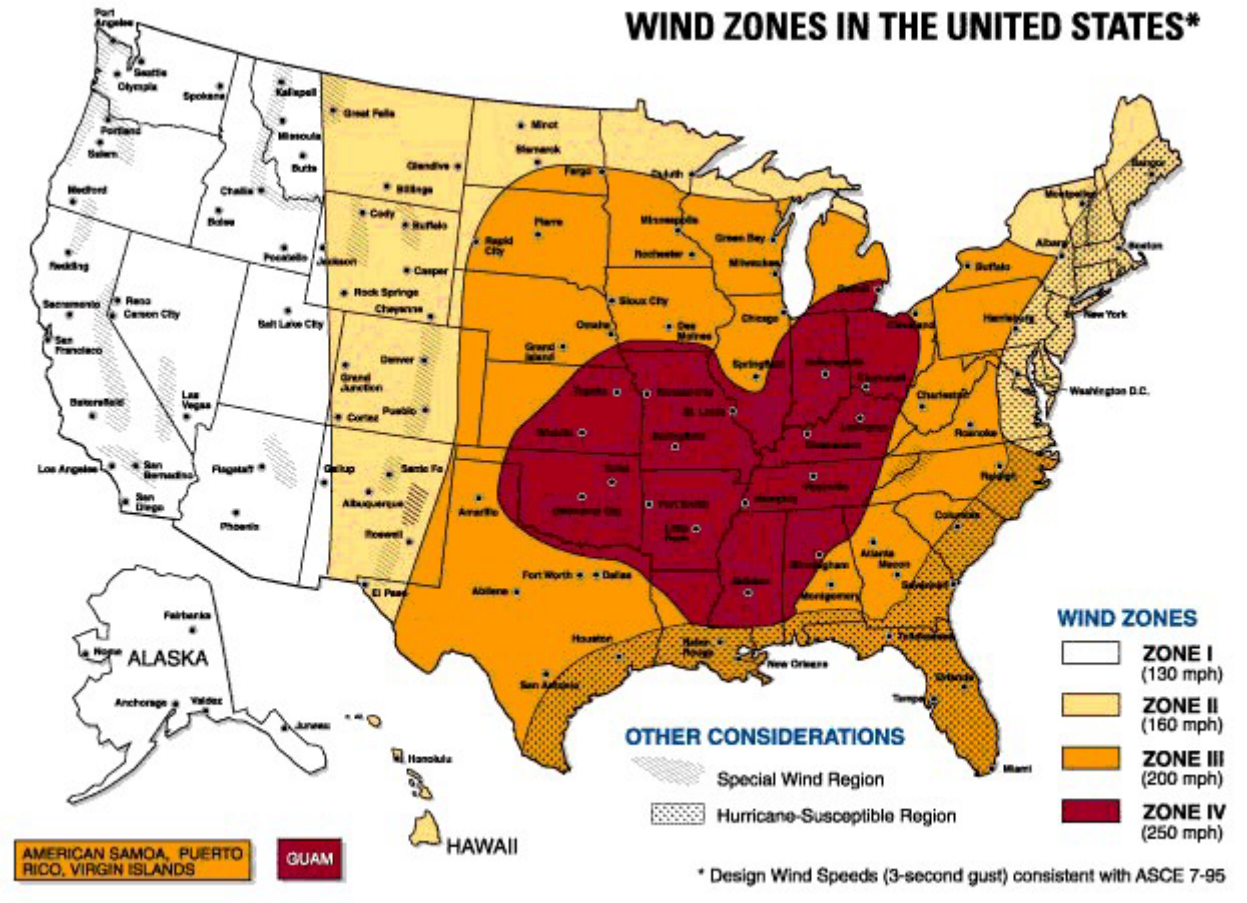


Figure I.2 Wind zones in the United States

Source: Federal Emergency Management Agency

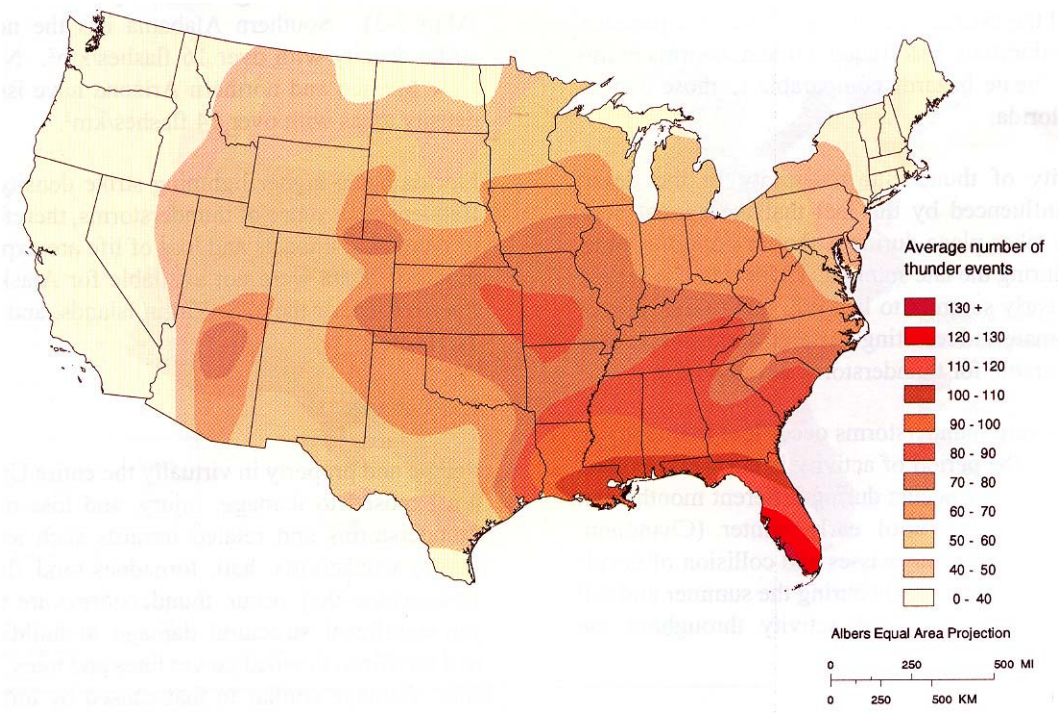
Thunderstorms: According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10 percent of these storms are classified as "severe." Although thunderstorms generally affect a small area when they occur, they are very dangerous because of their ability to generate tornadoes, hailstorms, strong winds, flash flooding, and

damaging lightning. While thunderstorms can occur in all regions of the United States, they are most common in the central and southern states because atmospheric conditions in those regions are most ideal for generating these powerful storms.

Thunderstorms are caused when air masses of varying temperatures meet. Rapidly rising warm moist air serves as the "engine" for thunderstorms. These storms can occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours.

The figure below illustrates thunderstorm hazard severity based on the annual average number of thunder events from 1948 to 1977.

Annual Average Number of Thunder Events



Source: Federal Emergency Management Agency

Analysis

Each of the localities in the Planning District has been affected by windstorms that cause property damage. High winds often accompany thunderstorms, hurricanes or tornadoes; the latter two are discussed in more detail in other sections of this report. Most of the damage is a result of downed trees, road closures, and utility and communication outages. Structural damage may be sustained in poorly constructed buildings.

Wind damage during Hurricane Ivan

Summary of Thunderstorms and High Wind

Thunderstorms and High Wind Record from 1956-2003					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	91	0	77	19,164,000	19,501,000
Fluvanna	34	1	0	338,000	0
Greene	39	0	75	18,636,000	19,501,000
Louisa	64	0	0	0	295,000
Nelson	41	0	75	18,577,000	19,501,000

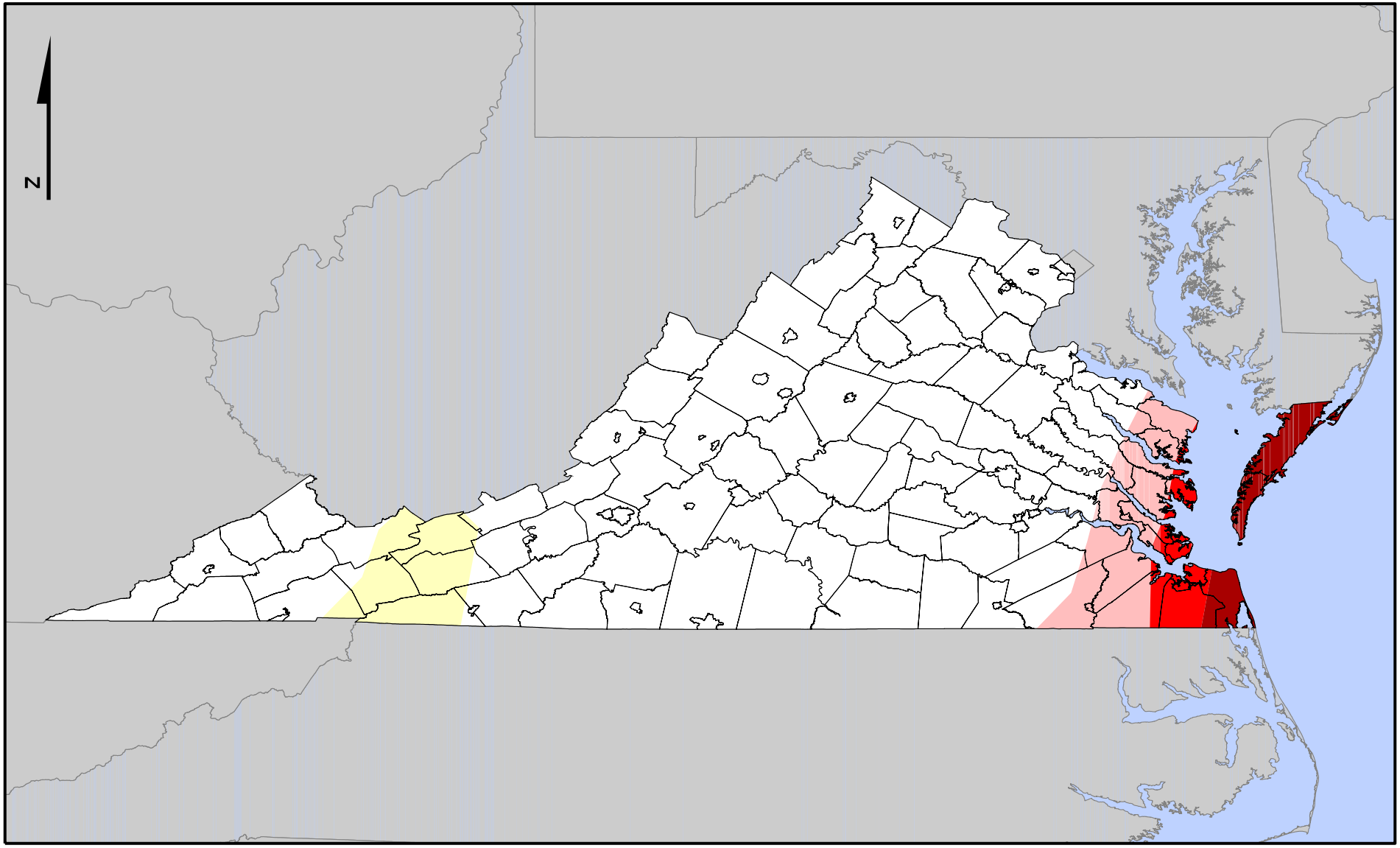
Source: National Climate Data Center

Notable windstorms and thunderstorms in the Planning District

Storm type	Damage	Date
High wind	$229,000 property damage	July 13, 2000
Thunderstorm/Hail	$150,000 property damage (Boswells Tavern)	May 13, 2000
Gusty winds	$500,000 property damage, 1 injury	March 31, 1997
High wind (Hurricane)	$265,000 property damage $7.6M crop damage (hurricane)	September 6, 1996
High wind		Dec 5, 1993

Source: NCDC, Albemarle Historical Society archived newspapers

BASIC WIND SPEEDS USED IN DESIGN & CONSTRUCTION



Windspeeds in miles per hour

- 120+
- 100-120
- 90-100
- 80-90
- Special Wind Region

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: July 2004

Data Sources: ASCE wind design speed, VT CGIT

Drought and Extreme Heat

Identification

Drought is a natural climatic condition caused by an extended period of limited rainfall beyond that which occurs naturally in a broad geographic area. High temperatures, high winds, and low humidity can worsen drought conditions and can make areas more susceptible to wildfire. Human demands and actions can also hasten drought-related impacts.

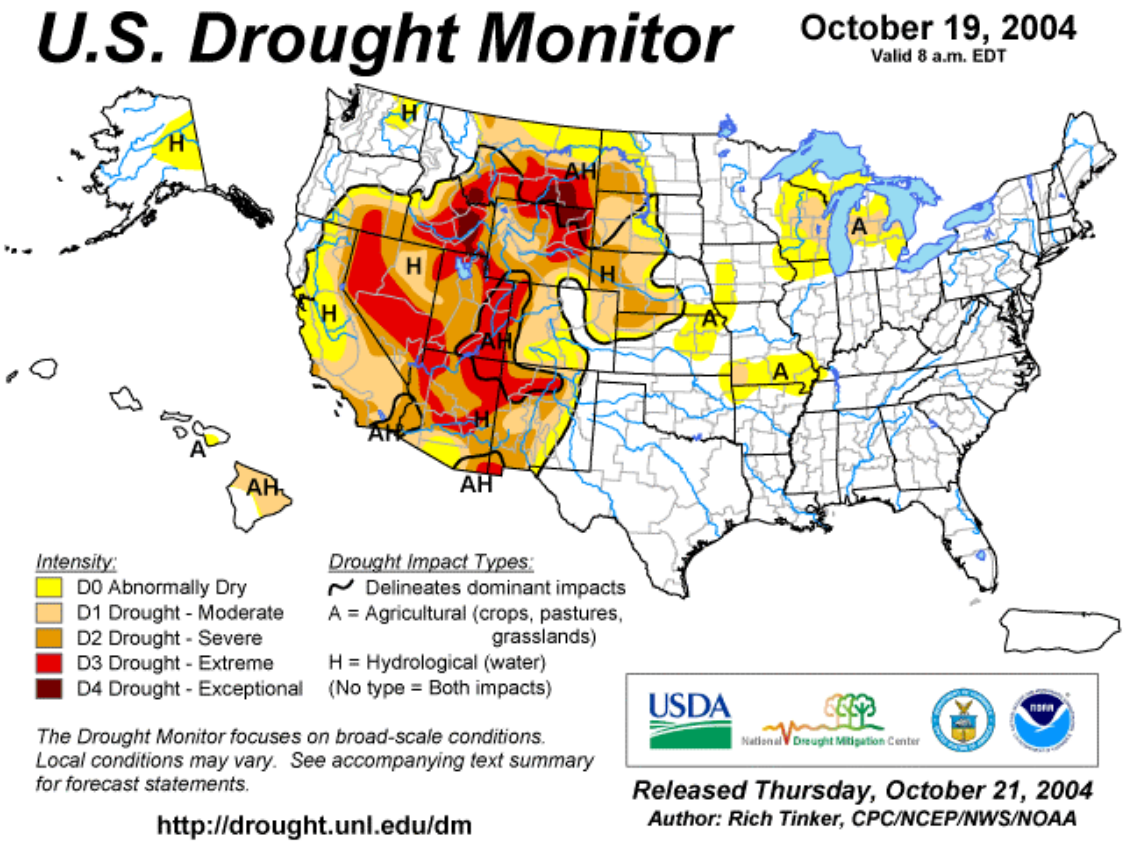
Droughts are frequently classified as one of the following four types:

- Meteorological,
- Agricultural,
- Hydrological, and
- Socio-economic.

Meteorological droughts are typically defined by the level of "dryness" when compared to an average or normal amount of precipitation over a given period of time. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts. Emphasis tends to be placed on factors such as soil water deficits, water needs based on differing stages of crop development, and water reservoir levels. Hydrological drought is directly related to the effect of precipitation shortfalls on surface and groundwater supplies. Human factors, particularly changes in land use, can alter the hydrologic characteristics of a basin. Socio-economic drought is the result of water shortages that limit the ability to supply water-dependent products in the marketplace.

While drought mostly impacts land and water resources, extreme heat can pose a significant risk to humans. Extreme heat can be defined as temperatures that hover 10°F or more above the average high temperature for the region, last for prolonged periods of time, and are often accompanied by high humidity. Under normal conditions, the human body's internal thermostat produces perspiration that evaporates and cools the body. However, in extreme heat and high humidity, evaporation is slowed and the body must work much harder to maintain a normal temperature. Elderly persons, young children, persons with respiratory difficulties, and those who are sick or overweight are more likely to become victims of extreme heat. Because men sweat more than women, they are more susceptible to heat-related illness because they become dehydrated more quickly. Studies have shown that a significant rise in heat-related illness occurs when excessive heat persists for more than two days. Spending at least two hours per day in air conditioning can significantly reduce the number of heat-related illnesses.

Extreme heat in urban areas can create health concerns when stagnant atmospheric conditions trap pollutants, thus adding unhealthy air to excessively hot temperatures. In addition, an "urban heat island effect" can produce significantly higher nighttime temperatures because asphalt and concrete (which store heat longer) gradually release heat at night.



Analysis

Drought: Although the region has experienced droughts, damage is rarely catastrophic. Crop damage is the primary type of damage resulting from droughts. In severe droughts, such as 2002, water usage restrictions have been put in place to preserve drinking supplies. Drought may also cause wells to go dry, causing problems for households and businesses left without running water. In 2002, the Department of Housing and Community Development implemented a program to assist low-income families in drilling new wells.

Summary of Droughts

Drought Record 1995-1999					
Locality	**#**	**Deaths**	**Injuries**	**Property Loss**	**Crop Damage**
Albemarle/Cville	9	2	0	0	$129,660,000
Fluvanna	3	0	0	0	$58,800,000
Greene	9	2	0	0	$129,660,000
Louisa	0	0	0	0	0
Nelson	9	2	0	0	$129,660,000

Source: National Climate Data Center

Notable droughts in the Planning District

Damage	Date
Fluvanna, Greene, Nelson, Louisa declared disaster areas. Thousands of dry wells, businesses closed, extensive water restrictions on businesses and households	2002
$129.7M crop damage	July-Aug 1999
$58.8M crop damage	Oct-Nov 1998
Nationwide – widespread damage	1931
Jamestown colony lands in an extended drought, not many survive.	1607

Source: NCDC, Albemarle Historical Society archived newspapers

Extreme Heat: The region experiences high temperatures every year, but injuries and fatalities from heat are rare. These conditions can lead to health problems, since heat exacerbates asthma and air pollution related breathing problems. People may overexert themselves or dehydrate while exercising as well. Elderly people are particularly susceptible to injury or death from extreme heat. Utility failures can also be caused by heat, and when power is lost, most people lose air-conditioning and fans to keep cool, leading to possible heat stroke. Fires that occur during drought are harder to combat since water may be limited and under lower pressure than normal.

According to the National Climate Data Center, there were 100 injuries and two fatalities related to extreme heat during July 14-16, 1995. June and July of 1999 experienced particularly hot temperatures with 112 injuries during June 7-9, 1999 and 80 injuries and one fatality during July 4-7, 1999.

Landslides

Identification

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels.

There are several types of landslides: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, mudflows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as from heavy rainfall or rapid

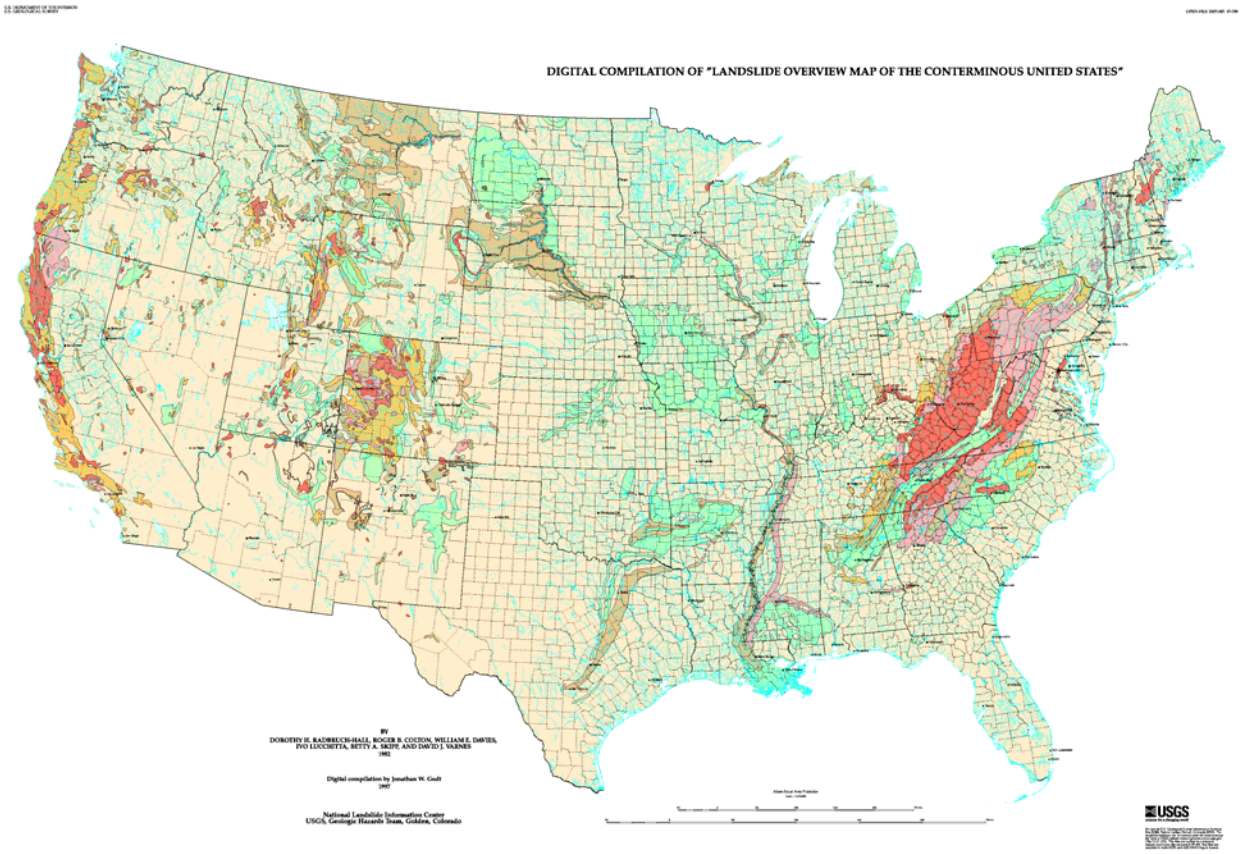
snowmelt, changing the soil into a flowing river of mud or "slurry." Slurry can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effect of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

In the United States, it is estimated that landslides cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

The figure below shows areas where large numbers of landslides have occurred and areas that are susceptible to landslides in the conterminous United States. This map layer is provided in the U.S. Geological Survey Professional Paper 1183, Landslide Overview Map of the Conterminous United States, available online at http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html.

Landslide Overview Map of the Conterminous United States



LANDSLIDE INCIDENCE
Low (less than 1.5% of area involved)
Moderate (1.5%-15% of area involved)
High (greater than 15% of area involved)

LANDSLIDE SUSCEPTIBILITY/INCIDENCE
Moderate susceptibility/low incidence
High susceptibility/low incidence
High susceptibility/moderate incidence

Source: United States Geological Survey

Analysis

The western edges of Greene and Albemarle County and much of Nelson County are most at risk of landslide in the Thomas Jefferson Planning District. When torrential rains hit the slopes of mountains, unstable earth can become loose and can be washed downhill. Earthquakes may also trigger rock and landslides, but this is rare in the Planning District.

During Hurricane Camille, extensive damage was done by landslides and flooding in Massies Mill, Woods Mill, Roseland, Tyro, Lovingston, Norwood, Schuyler, and along Davis and Muddy Creeks. There were an estimated 286 houses and outbuildings damaged or destroyed, 2 fraternal lodges, 1 warehouse, 2 churches, 17 trailers, 175 cars and trucks, 1 school, 2 pieces of construction equipment, 2 post offices, 11 pieces of farm machinery, 5 industrial plants of which one was a water system and about 18,500 acres of pasture and cropland.

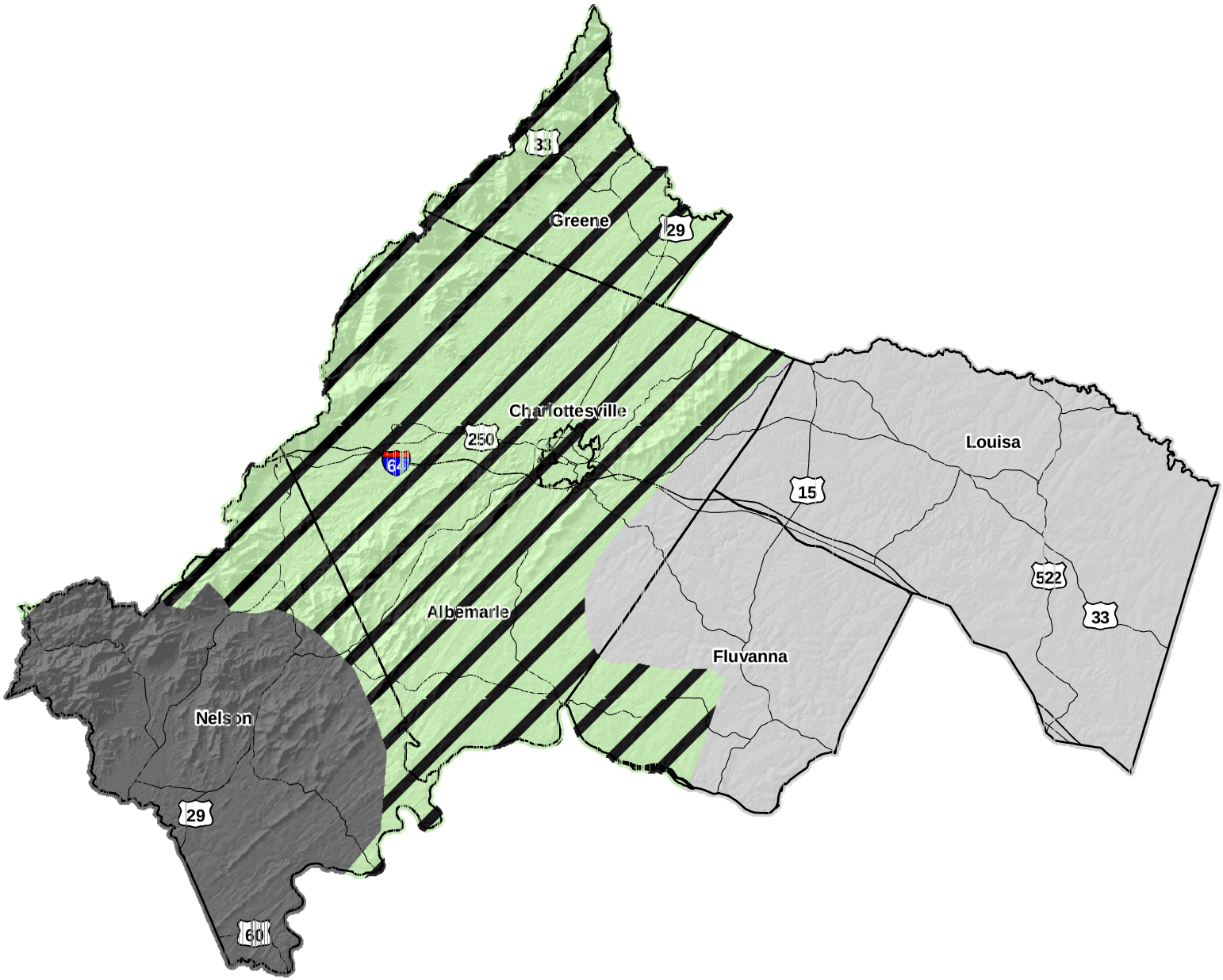
Hurricane and landslide damage in Nelson County

Landslide damage from Hurricane Camille

An intense storm in June 1995 triggered landslides, including soil slips, slumps, debris slides, and debris flows, as well as associated flooding along the North Fork of the Moormans River in the northwestern portion of Albemarle County. The area immediately affected by the storm was within the boundaries of Shenandoah National Park, but flooding resulted in the Sugar Hollow Reservoir and downstream for another four miles, as far as White Hall. The Sugar Hollow Reservoir acted as an impoundment for the boulders, silt, and trees that had been dislodged upstream.

No summary data of damage is available from the National Climate Data Center for landslides in the Planning District. The June 1995 event prompted Albemarle County to commission a study by the U.S. Geological Survey (USGS) to evaluate the potential for debris flows resulting from severe storms in the county. This study, *Debris-Flow Hazard Inventory and Evaluation: Albemarle County, Virginia* (USGS, 2000), did not find evidence of historic debris flows other than the 1995 event and some damage from Hurricane Camille near the Nelson County border. The eastern slopes of the Blue Ridge and the North and South Forks of the Moormans River were found to have both the requisite elevation and slope for debris flows and evidence of prehistoric debris flows; these areas were therefore considered to be the most susceptible to future debris flows. Several sites in the Covesville area, in the southern part of the county near the Nelson County border, were found to have the necessary elevation and slopes, but no evidence of debris flows other than moderate activity from Hurricane Camille along one stream. This area is therefore judged as having an intermediate susceptibility. As small areas of the Southwest Mountains and their southern extension south of Charlottesville have the requisite slope, but show no evidence of debris flows, they are rated with lower susceptibility. Carbon-14 sampling performed for the study indicates that recurrence intervals in Albemarle County for a specific site are on the order of 3,000 years, and similar sampling in Nelson County has indicated a recurrence interval of about 3,000-6,000 years; however, the historic record indicates that a debris flow will occur somewhere within the Blue Ridge of Virginia about once per decade.

Landslide Hazards in the TJPD

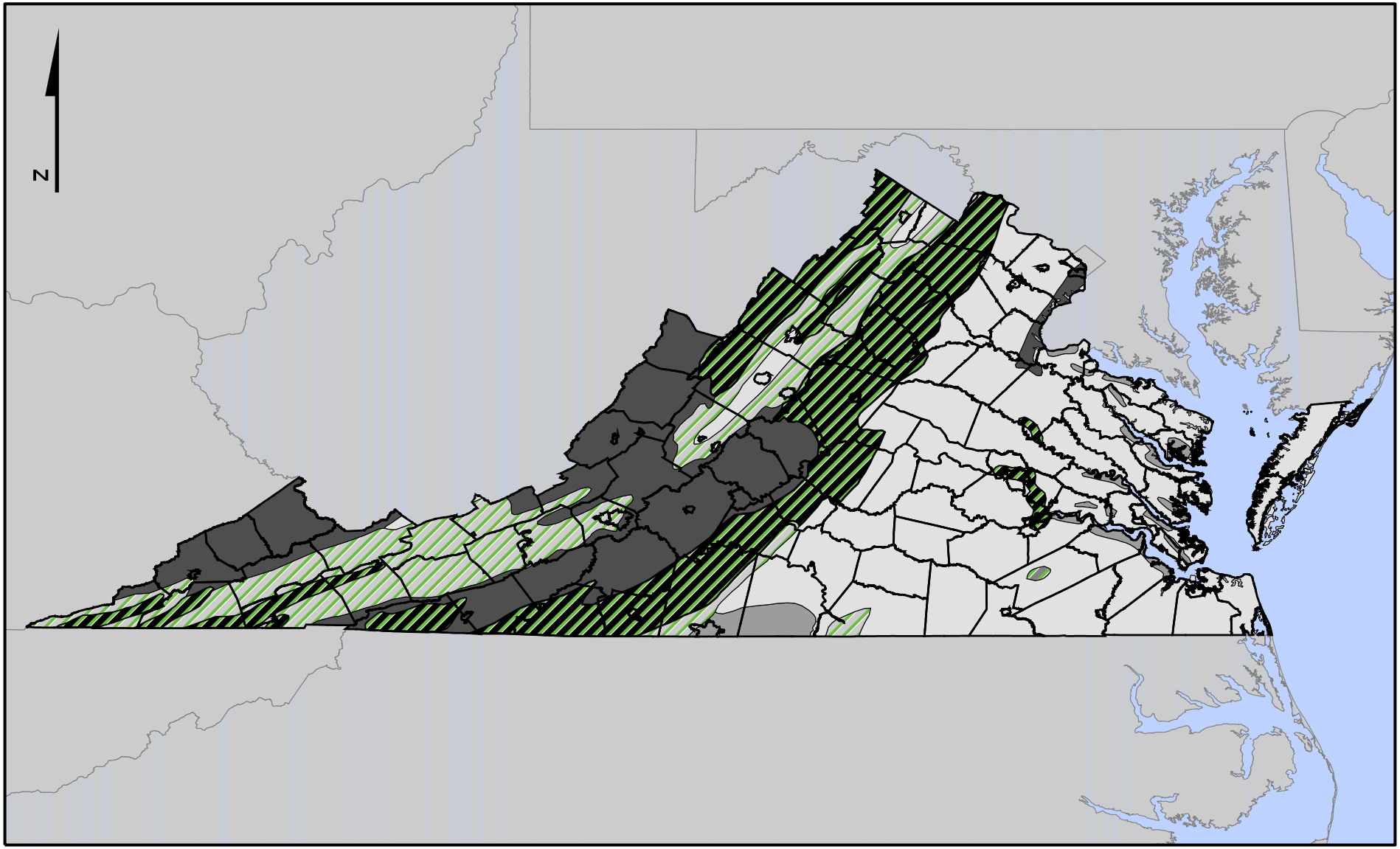


High Susceptibility & High Incidence
High Susceptibility & Low Incidence
Moderate Susceptibility & Low Incidence
High Incidence
Moderate Incidence
Low Incidence

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 28, 2004 C:\GIS\HMP\Landslides.mxd

LANDSLIDE HAZARDS FOR VIRGINIA



Susceptibility
- High Susceptibility & High Incidence
- High Susceptibility & Low Incidence
- Moderate Susceptibilty & Low Incidence

Incidence
- High Incidence
- Moderate Incidence
- Low Incidence

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: February 2004

Data Sources: USGS Nationsl Landslide Map, VT CGIT

Earthquake

Identification

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles; cause damage to property measured in the tens of billions of dollars; result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quicksand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's ten tectonic plates. These plate borders generally follow the outlines of the continents, with the North American plate following the continental border with the Pacific Ocean in the west, but following the mid-Atlantic trench in the east. As earthquakes occurring in the mid-Atlantic trench usually pose little danger to humans, the greatest earthquake threat in North America is along the Pacific Coast.

The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength, a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (see Table below). Each unit increase in magnitude on the Richter Scale corresponds to a ten-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using Roman numerals, with a I corresponding to imperceptible (instrumental) events, IV corresponding to moderate (felt by people awake), to XII for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in the table below.

Richter Scale

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0-7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

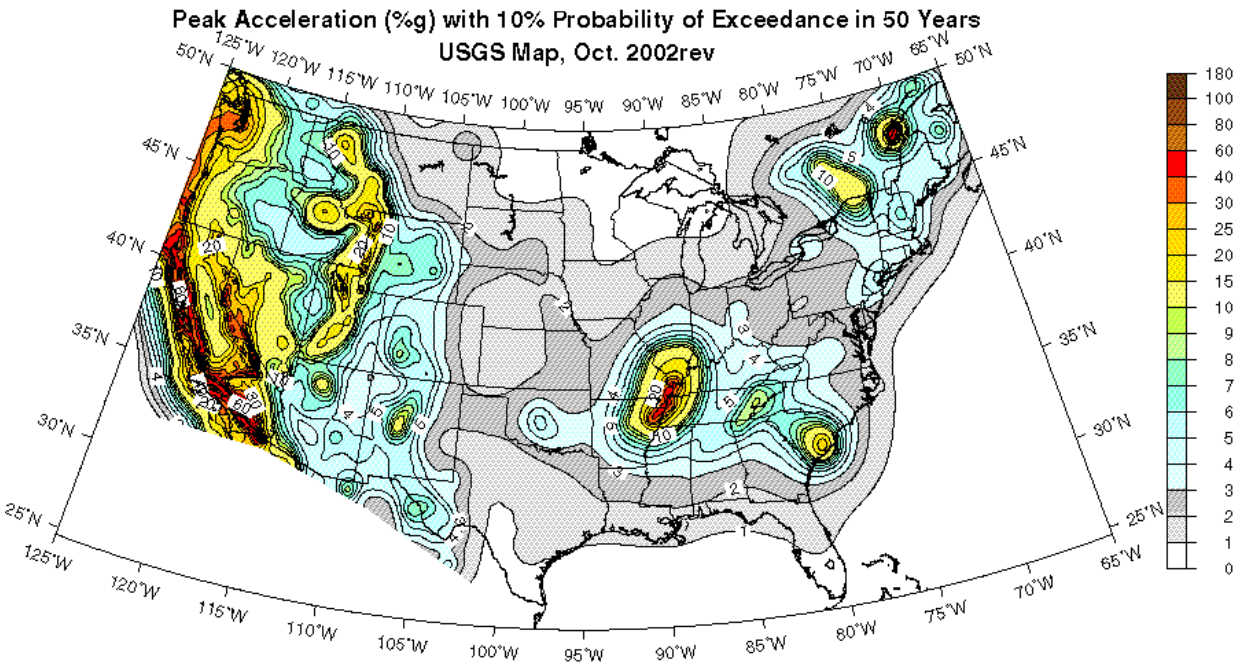
Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

Source: North Carolina Division of Emergency Management

The figure below shows the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10

percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards.



Source: United States Geological Survey

Analysis

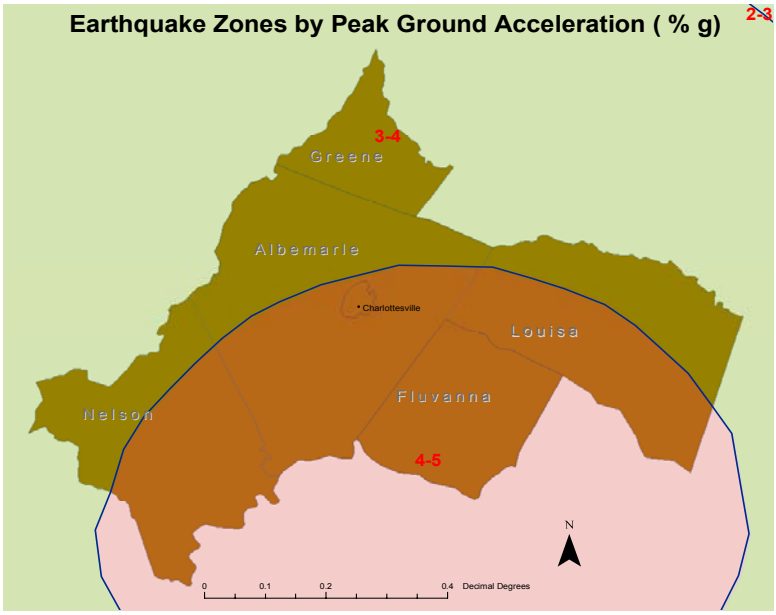
Although earthquakes do not pose a significant risk to the Thomas Jefferson Planning District, there have been several recoded earthquake events. Virginia has had over 160 earthquakes since 1977 of which 16% were felt. This equates to an average of one earthquake occurring every month with two felt each year. The central Virginia seismic zone is an area of the Virginia Piedmont that has long been recognized as an area of frequent seismic activity in the central Appalachians. The earthquakes occur at depths from near surface to approximately 20 km.

Seismicity of the United States, 1568-1989 (Revised) by Carl W. Stover and Jerry L. Coffman (USGS Professional Paper 1527, 1993, pages 376-378), *Department of GeoSciences at Virginia Tech, www.geol.vt.edu/outreach/vtso/)*

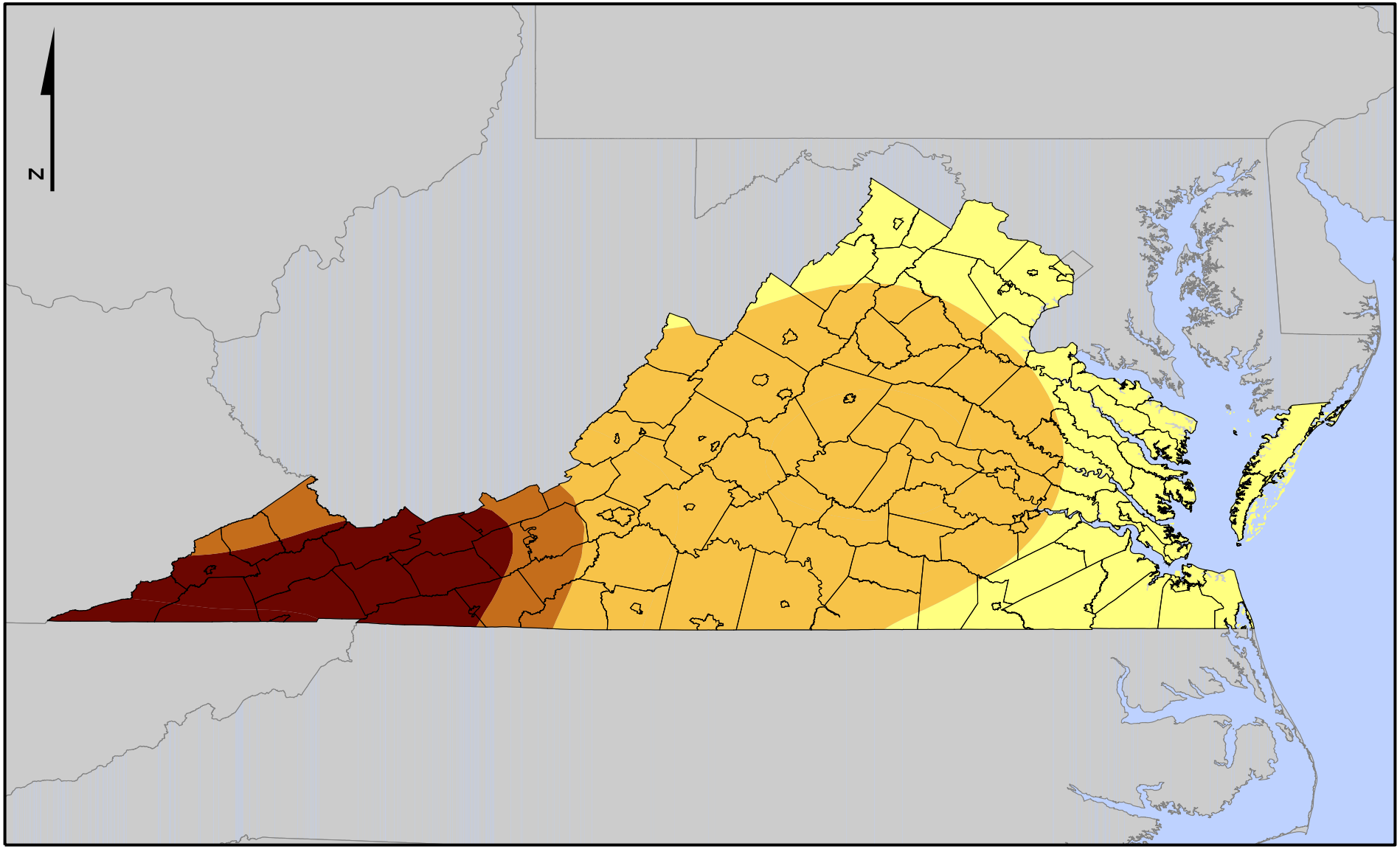
Notable earthquakes in the Planning District

Location	Damage	Date
Shadwell (Albemarle)	The focal depth was within a few kilometers of the surface, and this produced a strong acoustic signal that local officials attributed to an aircraft in transonic flight. Magnitude 3.2	Sept 22, 2001
Scottsville	It was felt from Washington, DC to the North Carolina border, and from Staunton, VA to Norfolk. Magnitude 4.0	Aug 17, 1984
Charlottesville	A moderate tremor at Charlottesville shook bricks from chimneys in some places. Also felt in other parts of Albemarle County.	Dec 26, 1929
Arvonia (Buckingham)	Chimneys were cracked at Ashby, about 20 km southeast of Arvonia, and a window was broken at a store at Buckingham. A "terrific" shock sent people rushing outdoors at Arvonia and displaced furniture. Felt strongly from Powhatan to Albemarle County.	Feb 11, 1907
Giles County, Va.	Largest in intensity and extent in Virginia in historical times. The earthquake had a maximum Modified Mercalli Intensity of VIII, based on "many downed chimneys" and "changes in the flow of springs." Felt from Georgia to Pennsylvania and from the Atlantic Coast westward to Indiana and Kentucky. Aftershocks continued through June 6, 1897. Magnitude 5.8	May 31, 1897
Central Va.	The highest intensities from this earthquake occurred mainly at towns near the James River waterfront in Goochland and Powhatan Counties, and in Louisa County. Magnitude 4.5	Dec 23, 1875
Central Va.	Chimney damage occurred at Buckingham. This earthquake was reported to be "quite strong" at Fredericksburg, Richmond, and Scottsville. At Scottsville, where every house in the village was shaken, water in the canal was "troubled," and boats were tossed to and fro. Magnitude 4.3	Nov 2, 1852
Wytheville	A severe earthquake that was observed over a large area threw down a chimney near Wytheville, in southwest Virginia, and shook down tops of chimneys at Buckingham Courthouse,. Houses were shaken violently at Staunton. Magnitude 4.9	Apr. 29, 1852
Central Va.	A rather strong shock agitated walls of buildings at Lynchburg and rattled windows violently. Fences along the road were shaken near the Louisa County Courthouse. It was described as "severe" at Charlottesville. Two miners were killed in a panic caused by the tremor at a mine near Richmond. Magnitude 4.5	Aug 27, 1833

FEMA uses the indicator of Peak Ground Acceleration (PGA) (%g, where g = 9.8 m/s^2) to show the probability of earthquakes in the U.S. The national map of Peak Ground Acceleration (%g) indicates that parts of the Planning District have a PGA rate of 3-4%g, while others (see map below) have a 4-5% PGA.


Earthquake Zones by Peak Ground Acceleration (% g)
2-3
3-4
Greene
Albemarle
Charlottesville
Louisa
Fluvanna
Nelson
4-5
N
0
0.1
0.2
0.4
Decimal Degrees

EARTHQUAKE PROBABILITY FOR VIRGINIA



10% Probability of Exceeding Peak Acceleration (%g) in 50 years.

1 - 2

3 - 4

5 - 6

7

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

Map prepared by Virginia Tech Center for Geospatial Information Technology

Date: February 2004

Data Sources: USGS Historical Seismicity Data, VT CGIT

Wildfire

Identification

A wildfire is any fire occurring in a wildland area (i.e. grassland, forest, brush land) except for fire under prescription. Wildfires are part of the natural management of the Earth's ecosystems, but may also be caused by natural or human factors. Over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

State and local governments can impose fire safety regulations on home sites and developments to help curb wildfire. Land treatment measures such as fire access roads, water storage, helipads, safety zones, buffers, firebreaks, fuel breaks, and fuel management can be designed as part of an overall fire defense system to aid in fire control. Fuel management, prescribed burning, and cooperative land management planning can also be encouraged to reduce fire hazards.

Fire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural disasters (tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Forest damage from hurricanes and tornadoes may block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high fire hazard areas. The increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for the inferno that can sweep through the brush and timber and destroy property in minutes.

Analysis

Wildfires are common in the Planning District, but are usually small and quickly controlled, creating little danger or loss. Most fires occur in the western part of the region, in sparsely populated mountainous areas, but fires have occurred in each locality. The breakdown of known causes is shown in the table on the next page. Fires are more prevalent in periods after heavy winter storms due to dropped branches and debris being readily available as fuel, and also tend to follow summers with droughts.

Property losses due to wildfires have been minimal in the Planning District, and there have been few injuries or fatalities due to fire in the region. Timber or crop damage is the most common loss, ranging from a few thousand to tens of thousand of dollars. More people moving into the countryside and using parks, fields and forests for recreation creates a higher potential for people to be put at risk during wildfire events.

Causes of Wildfires

Fire Cause Information			
Cause	%	Cause	**%**
Debris Burning	**46**	Lightning	**6**
Equipment Use	**16**	Juveniles	**6**
Incendiary (arson)	**15**	Railroad	**3**
Smoking	**8**	Total	**100**

Source: VA Department of Forestry

Summary of Wildfires

Wildfire Events 1995-2004						
Locality	**# of Fires**	**Acres**	**Timber/Crop Damage**	**Building/Personal Property Damage**	**Total Property Damage**	**Suppression Costs (VDOF costs only)**
Albemarle	**472**	**2,420**	**$13,685**	**$228,190**	**$241,675**	**$214,695**
Fluvanna	**108**	**445**	**$9,210**	**$171,050**	**$180,260**	**$7,909**
Greene	**69**	**115**	**$5,042**	**$43,950**	**$48,992**	**$4,581**
Louisa	**249**	**689**	**$65,065**	**$138,123**	**$203,188**	**$18,105**
Nelson	**241**	**3,098**	**$40,926**	**$1,202,095**	**$1,243,021**	**$229,670**
TJPD	**1139**	**6,767**	$133,928	$1,783,408	$1,917,336	$474,960

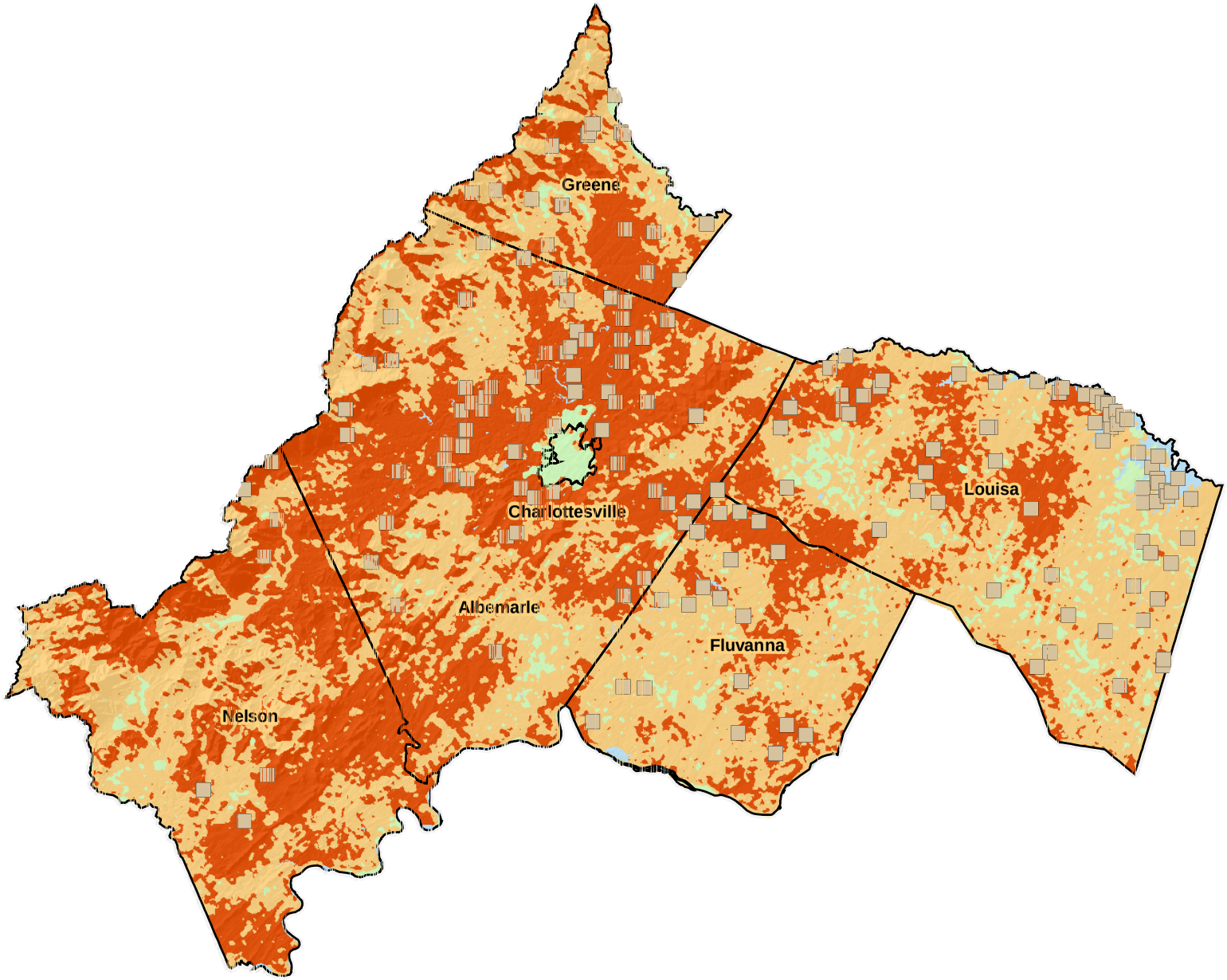
Source: VA Department of Forestry

Notable Wildfires in the Planning District

Event	Damage	Date
Albemarle 01-069	$25,000 in timber damage, $1,345,000 in property protected. $122,000 suppression cost, caused by arson.	November 19, 2001
Fluvanna 00-006	$139,000 in building damage, fire caused by hot ashes.	November 13, 2000
Nelson 99-029	$20,000 in timber damage, fire caused by arson.	May 3, 1999
Nelson 98-022	$10,000 in timber damage, $620,000 in property protected. Fire caused by lightning.	November 26,1998
Fluvanna 97-016	$10,000 in timber and property damage, after debris fire escaped. $500,000 in property protected.	May 8, 1997

Source: VA Department of Forestry

Wildfire Risk Assessment

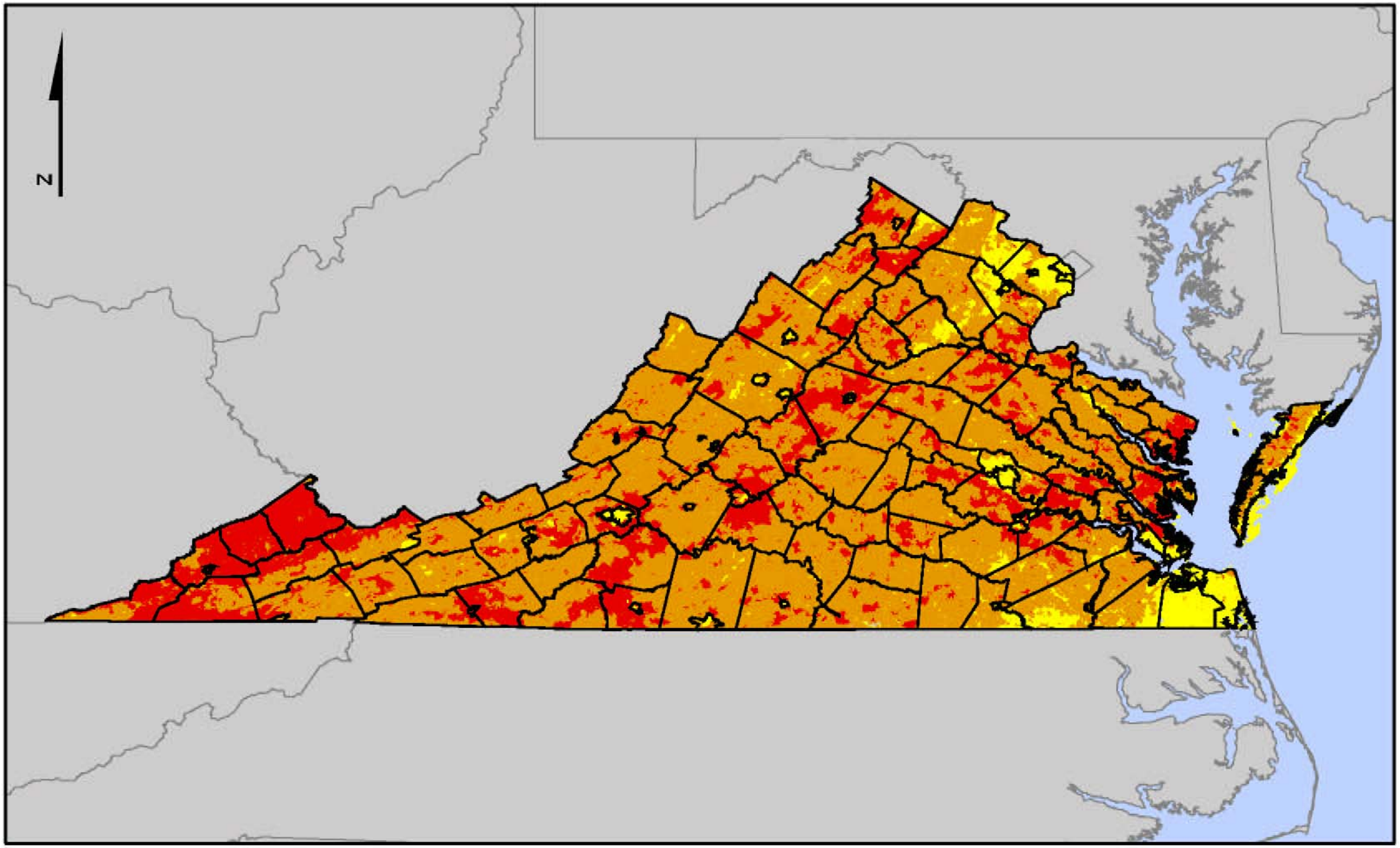


Low Moderate High Woodland Home Community

Thomas Jefferson Planning District Commission

This map is for general planning purposes only.
C:\GIS\HMP\TJPD Wildfire Risk 01/21/05
Source: The Virginia Department of Forestry, July 2003, thomasjefferson

FIRE RANK IN VIRGINIA



1 - Low 2 - Medium 3 - High

Map prepared by Virginia Tech Center for Geospatial Information Technology
Date: February 2004
Data Sources: Virginia Department of Forestry Fire Risk Mapping, VT CGIT

Dam Failure

Identification

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation and maintenance.

There are about 80,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

Though dams have many benefits, they also can pose a risk to communities if not designed, operated, and maintained properly. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if development exists downstream of the dam. If a levee breaks, scores of properties are quickly submerged in floodwaters and residents may become trapped by this rapidly rising water. The failure of dams and levees has the potential to place large numbers of people and great amounts of property in harm's way.

Analysis

The National Inventory of Dams, maintained by the U.S. Army Corps of Engineers, is a list of all private and public dams meeting specific criteria for the definition of a dam. The criteria exclude insignificant dams, natural dams, and privately owned ponds. Each dam is ranked in accordance to its hazard potential, with high hazard dams being those where failure or misoperation will most likely cause loss of human life.

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable: One or more expected	Yes (but not necessary for this classification)

Of 158 dams in the TJPDC, 9 are classified as high hazard, 17 are of significant risk, 98 are low risk, and 28 have not been classified.

Sugar Hollow Dam, Albemarle County

High Risk dams

Name	Dam Id	Dam Class	County	River	Drain Area
Lower Ragged Mountain Dam	VA000260	HPDG	Albemarle	Moores Creek	1.8300
Sugar Hollow Dam	VA000261	HPDG	Albemarle	Moormans River	17.2000
South Rivanna Dam	VA000262	HPDG	Albemarle		259.0000
Upper Ragged Mountain	VA000272	HPDE	Albemarle	Moores Creek	1.3000
Mink Creek Dam	VA000275	HPDE	Albemarle	Mink Creek	0.9000
Birdwood Dam	VA000293	HPDE	Albemarle	Tr-Morey Creek	0.0000
Greene Acres Dam	VA000705	HPDE	Greene	Tr-South River	0.6000
Stevens Lake Dam	VA000955	HPDE	Nelson	Tr-Brown Creek	0.1300
Lake Anna Dam and Reservoir	VA001245	HPDE	Louisa	North Anna Reservoir	343.0000

(HPD = High Potential Loss Dam; E = Earth, G = Gravity)

Name	Nearest City	Distance to City	Purpose	Emergency Action Plan (EAP)	Year Compl
Lower Ragged Mountain Dam	Charlottesville	2	S	Y	1908
Sugar Hollow Dam	Whitehall	5	S	Y	1950
South Rivanna Dam		0	SH	NR	1966
Upper Ragged Mountain	Charlottesville	3	S	N	1885
Mink Creek Dam	Scottsville	0	CSR	Y	1977
Birdwood Dam	Charlottesville	2	IR	NR	1930
Greene Acres Dam	Stanardsville	2	R	Y	1970
Stevens Lake Dam	Town of Colleen	0	S	NR	1960
Lake Anna Dam and Reservoir	Hewlett	15	S	Y	1972

(C = flood control, H = hydropower, I = irrigation, R = recreation, S = water supply)

Significant Risk Dams

Name	Dam Id	Dam Class	County	River	Drain Area
Lickinghole Creek	VA000212	HPDG	Albemarle	Lickinghole Creek	13.3000
Middle Mint Spings Dam	VA000217	HPDE	Albemarle	Powells Creek	0.5000
Norfields Dam	VA000257	HPDE	Albemarle		0.0000
Beaver Creek Dam #1	VA000263	HPDE	Albemarle	Beaver Creek	9.4500
Grahams Dam	VA000281	HPDE	Albemarle	Tr-Camp Creek	0.0000
Upper Mint Springs Dam	VA000282	HPDE	Albemarle	Powells Creek	0.2000
Baileys Dam	VA000287	HPDE	Albemarle	Tr-Rivanna River	0.0000

Significant Risk Dams

Name	Dam Id	Dam Class	County	River	Drain Area
Swifts Dam	VA000503	HPDZ	Louisa	Little River	0.0000
South Anna Dam #5	VA000508	HPDE	Louisa	Wheeler Creek	4.0000
Greene Mountain Lake Dam	VA000694	HPDE	Greene	Blue Run	7.0000
Lake Monticello Dam	VA000730	HPDE	Fluvanna	Boston Creek	8.4000
Watts Dam	VA000953	HPDE	Nelson	Tr-Black Creek	0.0000
Rockfish River Dam	VA000954	HPDG	Nelson	Rockfish River	0.0000
Rockfish Farms Dam	VA000956	HPDE	Nelson	Tr-Williams Creek	1.0000
Lake Monocan Dam	VA000957	HPDE	Nelson	Allan Creek	1.4100
Nelson Dam	VA000958	HPDE	Nelson	Tr-Bobs Creek	1.2400
South Anna Dam #22	VA001006	HPDE	Louisa	Northeast Creek	8.6300
South Anna Dam #3	VA001022	HPDE	Louisa	Fielding Creek	2.8500

(HPD = High Potential Loss Dam; E = Earth, G = Gravity, Z = Miscellaneous)

Name	Nearest City	Distance to City	Purpose	EAP	Year Compl
Lickinghole Creek		0	C	Y	1994
Middle Mint Spings Dam		0	R	Y	1960
Norfields Dam		0	R	NR	0
Beaver Creek Dam #1	Charlottesville	20	CSR	Y	1964
Grahams Dam	Shadwell	1	SR	NR	1967
Upper Mint Springs Dam	Crozet	1	RS	Y	1961
Baileys Dam	Charlottesville	2	R	NR	1953
Swifts Dam	VA State Route 609	0	RS	NR	1850
South Anna Dam #5	VA State Route 19	0	C	Y	1973
Greene Mountain Lake Dam	Advance Mills	9	R	Y	1969
Lake Monticello Dam	VA State Route 600	0	R	Y	1969
Watts Dam	ST RT 56 & 158	1	R	NR	1961
Rockfish River Dam	Schuyler	0	O	NR	1904
Rockfish Farms Dam	Onan	1	R	Y	1971
Lake Monocan Dam	Lodebar and Nellysford	1	RI	Y	1954
Nelson Dam	Variety Mills	3	R	Y	1959
South Anna Dam #22	VA State Route 33	0	SC	Y	1982
South Anna Dam #3	VA State Route 15	0	C	Y	1980

(C = flood control, I = irrigation, O = other, R = recreation, S = water supply)

Although there has not been a significant history of dam failure in the region, a threat to property and life is possible with the failure of any of the high hazard dams. The Lake Louisa dam failed during Hurricane Camille in 1969. It is considered a rare event because of the severity of the storm and the age of the dam. Most dams in the TJPDC are relatively undeveloped at the base of the dam, with most development occurring behind the dams near the lakes. The Ragged Mountain Dam has the potential for generating the most property damage, injury, and loss of life if it fails due to its proximity to the City of Charlottesville, the densest population center in the region. As Sugar Hollow and Crozet develop further as is projected, the dam at Sugar Hollow may become a larger threat. The South Fork Rivanna Dam would also threaten the urban Albemarle and Charlottesville landscape should it fail. Restrictions on development in the floodplains have limited the risk of dam failure losses, but older structures may be at risk.

High Hazard and Significant Hazard Dams in the TJPD

▲ High Hazard - 10 Dams

▲ Significant Hazard - 19 Dams

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
January 10, 2005 C:\GIS\HMP\Dams
Source: National Inventory of Dams, U.S. Army Corps of Engineers

Other

The following list identifies additional hazards. Some of the hazards such as lightning and hail do exist in the Planning District, but do not pose a significant threat, while others such as volcanoes and tsunamis do not affect the Planning District.

Lightning: Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 89 people are killed each year by lightning strikes in the United States. The greatest threat from lightning is the chance of starting a wildfire, discussed in the wildfire section.

Hailstorms: Hailstorms are an outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation—as balls or irregularly shaped masses of ice greater than 0.75 in. (1.91 cm) in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size.

Hailstorms have caused some damage to the region including softball sized hail on July 3, 1983, but in general do not pose a serious threat. *(Source: NCDC, Albemarle Historical Society archived newspapers).*

Erosion: Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which is concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils. Major storms

such as hurricanes may cause significant erosion by combining high winds with heavy surf and storm surge to significantly impact the shoreline.

Expansive Soils: Soils and soft rock that tend to swell or shrink due to changes in moisture content are commonly known as expansive soils. In the United States, two major groups of rocks serve as parent materials of expansive soils, and occur more commonly in the West than in the East. The first group consists of ash, glass, and rocks of volcanic origin. The aluminum silicate minerals in these volcanic materials often decompose to form expansive clay minerals of the smectite group, the best known of which is montmorillonite. The second group consists of sedimentary rock containing clay minerals, examples of which are the shales of the semiarid West-Central States. Because clay materials are most susceptible to swelling and shrinking, expansive soils are often referred to as swelling clays.

Changes in soil volume present a hazard primarily to structures built on top of expansive soils. Most engineering problems caused by volume changes in swelling clays result from human activities that modify the local environment. They commonly involve swelling clays beneath areas covered by buildings and slabs or layers of concrete and asphalt, such as those used in construction of highways, canal linings, walkways, and airport runways.

(From North Central Texas Council of Governments Multi Hazard Mitigation Hazard Identification, www.hazmap.nctcog.org/risk_assessment/Chapter7.asp)

Land subsidence: Land subsidence is the lowering of the land-surface elevation from changes that take place underground. Common causes of land subsidence from human activity are pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers (sinkholes); collapse of underground mines; drainage of organic soils; and initial wetting of dry soils (hydrocompaction). Land subsidence occurs in nearly every state of the United States, but is more prevalent in the Southwestern part of the country.

Land subsidence causes many problems including: (1) changes in elevation and slope of streams, canals, and drains; (2) damage to bridges, roads, railroads, storm drains, sanitary sewers, canals, and levees; (3) damage to private and public buildings; and (4) failure of well casings from forces generated by compaction of fine-grained materials in aquifer systems. In some coastal areas, subsidence has resulted in tides moving into low-lying areas that were previously above high-tide levels.

(From S.A. Leake, US Geological Survey, www.geochange.er.usgs.gov/sw/changes/ anthropogenic/subside/).

Tsunami: The word tsunami is Japanese and means "harbor wave." A tsunami is a series of great waves that are created by undersea disturbances such as earthquakes or volcanic eruptions. From the area of disturbance, tsunami waves will travel outward in all directions. Tsunamis can originate hundreds or even thousands of miles away from coastal areas.

In the United States, tsunamis have historically affected the West Coast, but the threat of tsunami inundation is also possible on the Atlantic Coast. Pacific Ocean tsunamis are classified as local,

regional, or Pacific-wide. Regional tsunamis are most common. Large-scale Pacific-wide tsunamis are much less common, with the last one being recorded in 1964, but consist of larger waves, which have high potential to cause destruction. However, the December 2004 tsunami which struck Sri Lanka, Indonesia, India, Thailand and other small countries, completely destroyed cities and towns. After a month of searching, the death toll is over 100,000 with 125,000 people still missing. The effects of this tsunami were felt even here, as relief, money, and volunteers are still being sent to these countries in dire need of assistance.

Volcano: Over 75 percent of the Earth's surface above and below sea level, including the seafloors and some mountains, originated from volcanic eruption. Emissions from these volcanoes formed the Earth's oceans and atmosphere. Volcanoes can also cause tsunamis, earthquakes, and dangerous flooding.

There are more than 500 active volcanoes in the world. More than half of these volcanoes are part of the "Ring of Fire," a region that encircles the Pacific Ocean. More than 50 volcanoes in the United States have erupted one or more times in the past 200 years. The most volcanically active regions of the nation are in Alaska, Hawaii, California, Oregon and Washington. The danger area around a volcano covers approximately a 20-mile radius. Some danger may exist 100 miles or more from a volcano.

Avalanche: An avalanche can be defined as a large mass of snow, ice, etc, detached from a mountain slope and sliding or falling suddenly downward. To occur, they need a steep slope, snow cover, a weak layer in the snow cover, and a trigger, such as an earthquake, thermal change, blizzard, or human intervention. Most common in the mountainous western U.S., none of these conditions are found in the TJPDC area and no reported deaths from avalanches have occurred since data recording began in 1950 (Source: Colorado Avalanche Information Center).

Data Sources

American Society of Civil Engineers (ASCE)*, "Facts About Windstorms."*
Web site: www.windhazards.org/facts.cfm

Bureau of Reclamation*, U.S. Department of the Interior*
Web site: www.usbr.gov

Federal Emergency Management Agency *(FEMA)*
Web site: www.fema.gov

National Climatic Data Center (NCDC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: http://lwf.ncdc.noaa.gov/oa/ncdc.html

National Drought Mitigation Center, University of Nebraska-Lincoln
Web site: www.drought.unl.edu/index.htm

National Severe Storms Laboratory (NSSL), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nssl.noaa.gov

National Weather Service (NWS), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nws.noaa.gov

Storm Prediction Center (SPC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service
Web site: www.spc.noaa.gov

The Tornado Project, St. Johnsbury, Vermont
Web site: www.tornadoproject.com

United States Geological Survey (USGS), U.S. Department of the Interior
Web site: www.usgs.gov

United States Geological Survey (USGS), U.S. Department of the Interior
Debris-Flow Hazard Inventory and Evaluation: Albemarle County, Virginia.

Vulnerability Assessment

201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of: The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas…

201.6(c)(2)(iii): For multijurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The *Vulnerability Assessment* section provides an overview and analysis of vulnerability in the Thomas Jefferson Planning District for the hazards listed below. This listing differs slightly in terminology, order and grouping from the *Hazard Identification and Analysis* sections as those hazards affecting the Planning District are more fully categorized and explored. Hazards that pose significantly less risk to the region are not covered in this section. Where appropriate, distinctions have been made regarding relative risk for each locality.

Risk contains three elements: hazard, vulnerability, and exposure. A **hazard** is an act or phenomenon that has the potential to produce harm or other undesirable consequences of a person or thing. **Vulnerability** is a susceptibility to physical injury, harm, damage, or economic loss. **Exposure** describes the people, property, systems, or functions that could be lost to a hazard.

This section includes:

1. Methodology
2. Population and Building Exposure
3. Development Trends
4. Infrastructure
5. Critical Facilities
6. Estimating Potential Loss
    a. Floods
    b. Severe Winter Storms
    c. Hurricanes
    d. Windstorms
    e. Tornadoes
    f. Drought
    g. Earthquake
    h. Wildfire
    i. Dam Failure

Methodology

Data are available at many levels, and the most efficient way to achieve loss estimates has been the result of combining data from federal, state, and local sources. Some localities were extremely limited in the amount of data available to them, and consequentially, finding values for hazard loss proved to be more difficult for some areas of the Planning District and for some hazards. National data provided a starting point to assess the potential number of occurrences of certain hazards in the Planning District. State data where utilized to assess vulnerability. Local data were used where available, and include building footprints, E-911 address files, parcel data, tax assessor data, and floodplains digitized by the Planning District Commission where not available from FEMA. Additionally HAZUS-MH was used to estimate potential damages from hurricanes.

Population and Building Exposure

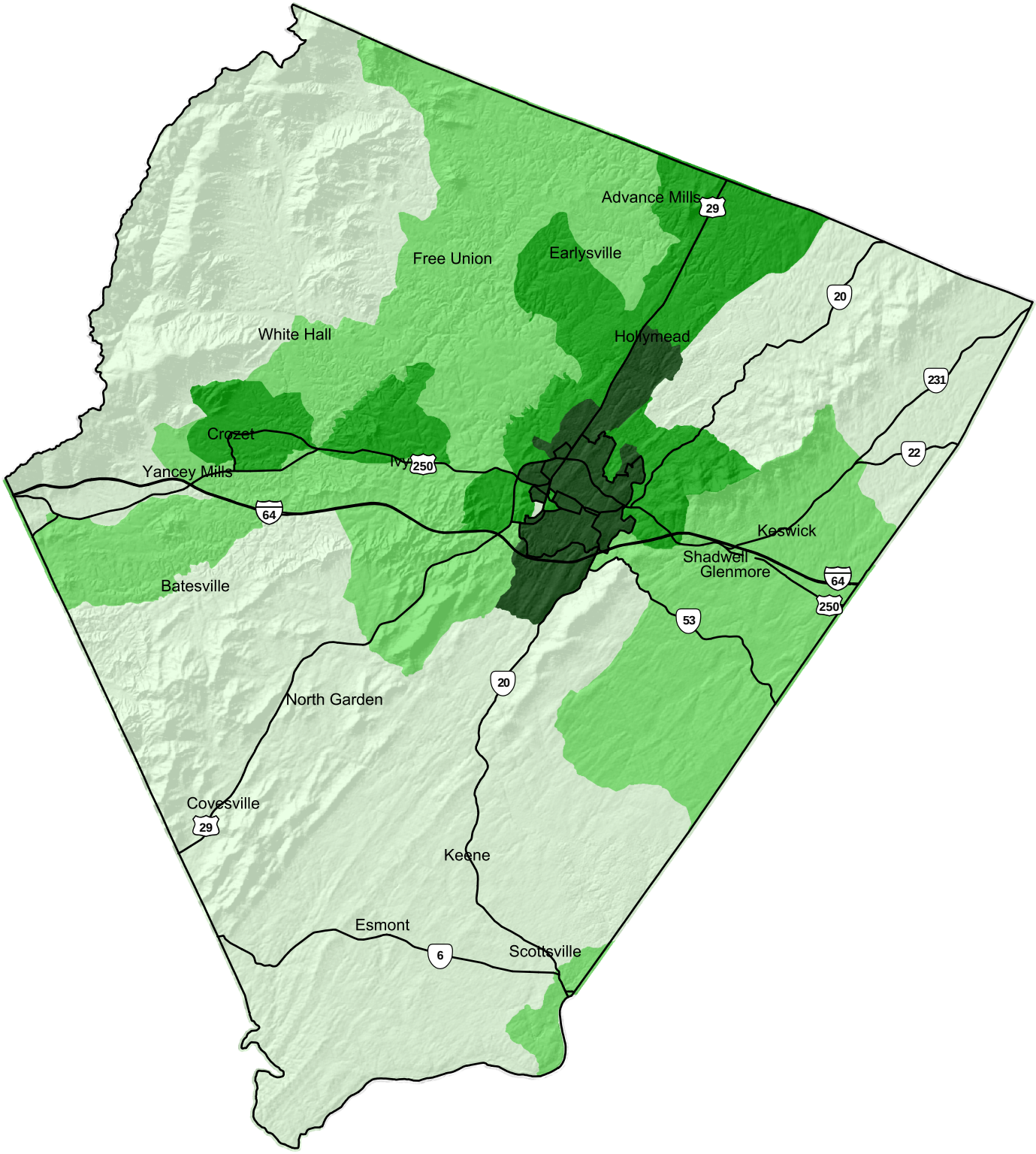
Population

According to the 2000 Census, the population of the Thomas Jefferson Planning District was 199,649. The table below shows the population by locality. The following pages include maps for each locality illustrating population density.

Locality	Population
Charlottesville	40,099
Albemarle	84,186
Fluvanna	20,047
Greene	15,244
Louisa	25,627
Nelson	14,445
Region	199,648

Source: US Census

Albemarle-Charlottesville Population Density

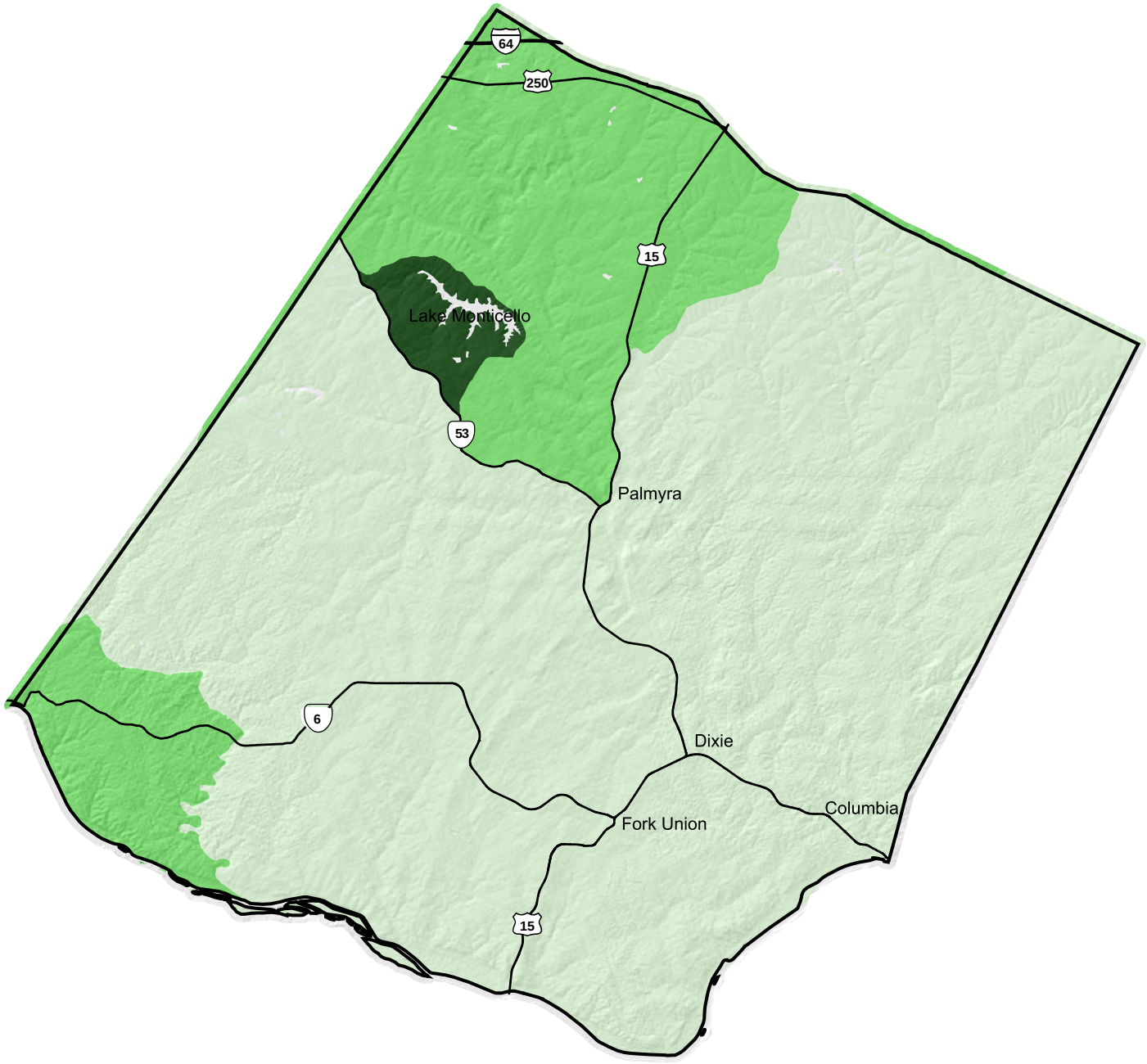


Persons Per Square Mile

0 - 50	151 - 1000
51 - 150	Over 1000

Thomas Jefferson
Planning District Commission

Fluvanna Population Density



Persons Per Square Mile

0 - 50

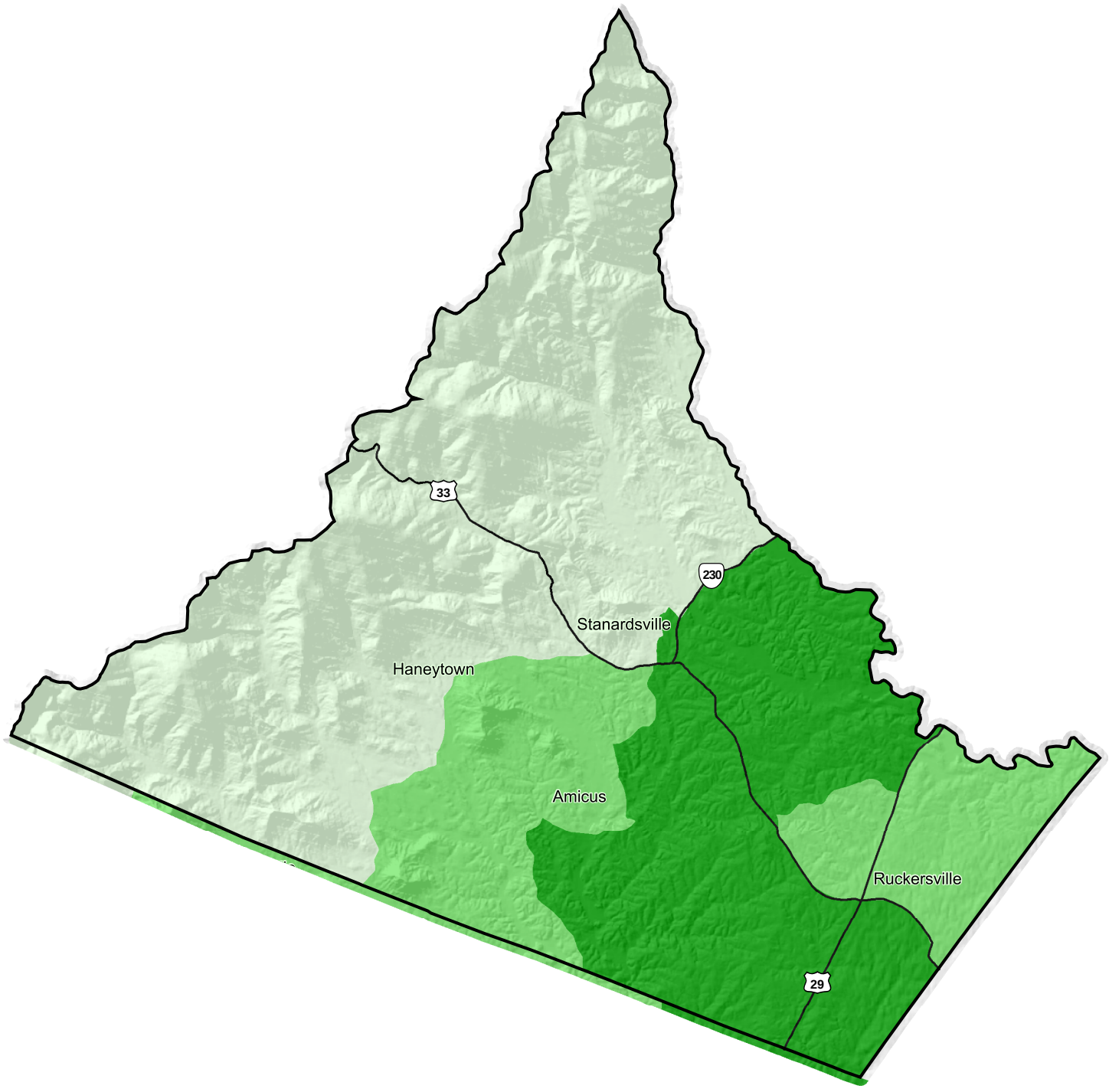
51 - 150

151 - 1000

Over 1000

Thomas Jefferson Planning District Commission

Greene Population Density



Persons Per Square Mile

0 - 50

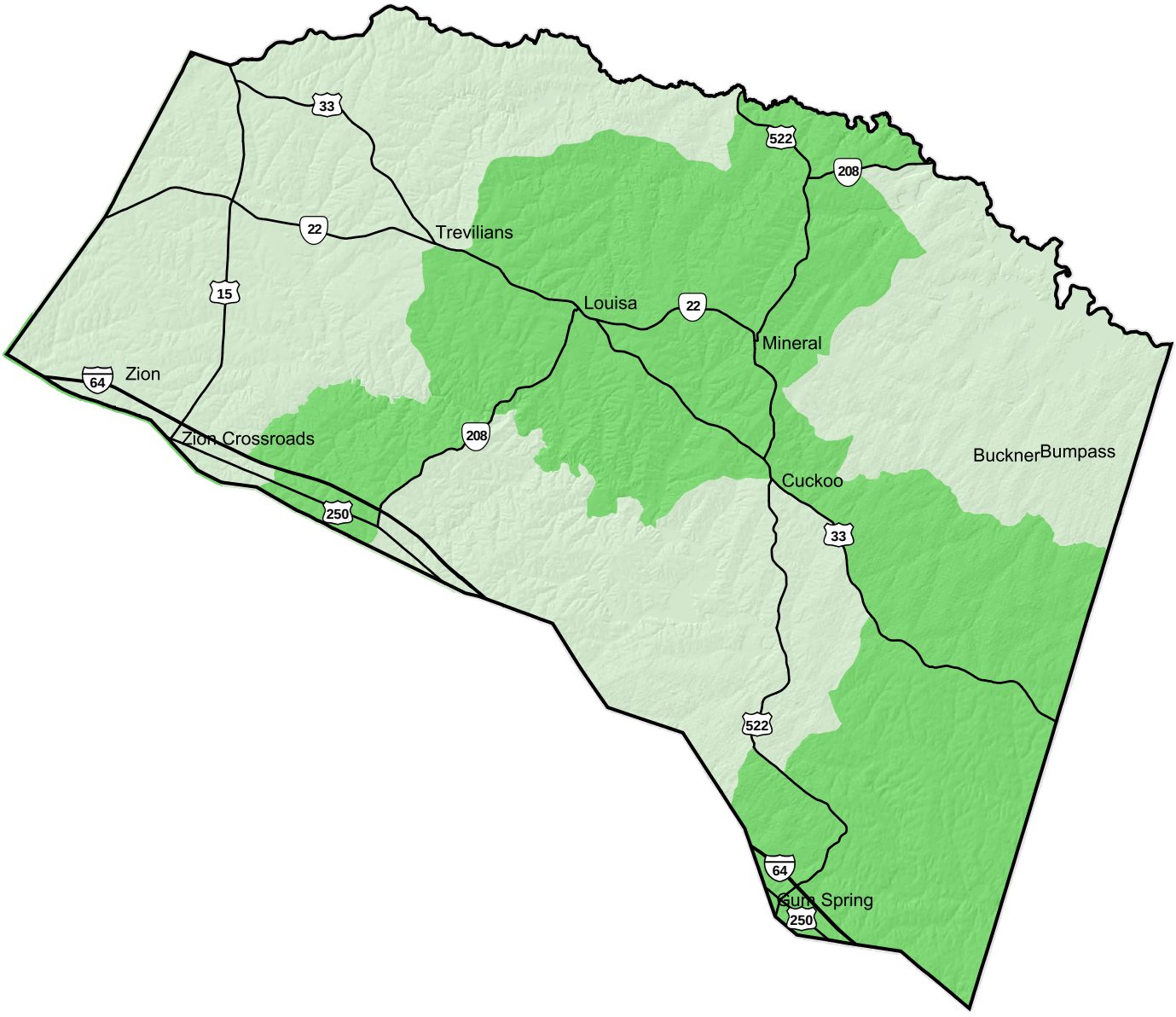
51 - 150

151 - 1000

Over 1000

Thomas Jefferson Planning District Commission

Louisa Population Density

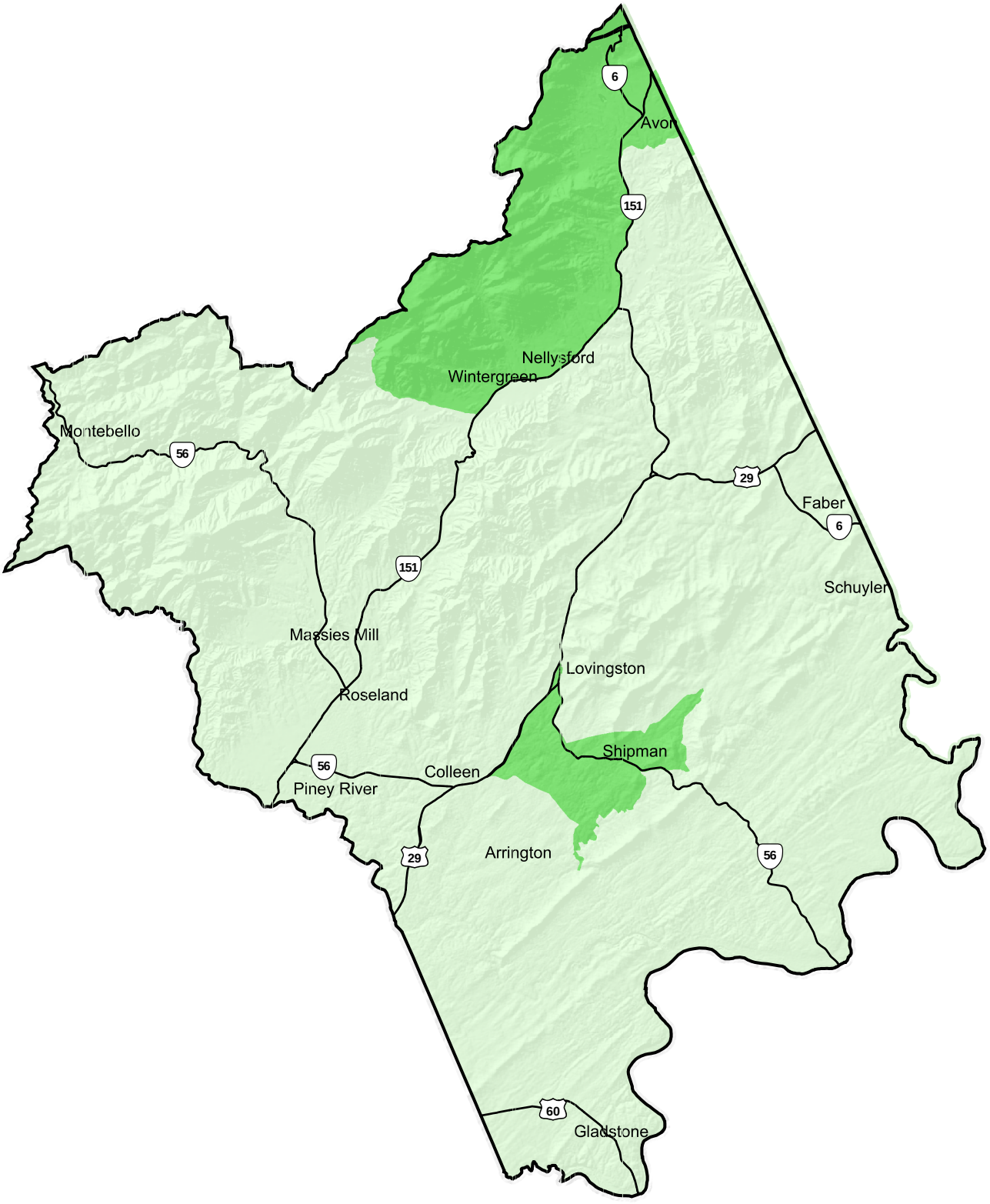


Persons Per Square Mile

0 - 50	151 - 1000
51 - 150	Over 1000

Thomas Jefferson Planning District Commission

Nelson Population Density



Persons Per Square Mile

0 - 50	151 - 1000
51 - 150	1001 - 23833

Thomas Jefferson Planning District Commission

Existing Buildings

The HAZUS-MH inventory catalogs approximately 73,000 structures at a value of over $13 million in the Planning District, but this is a significant undercount of building structures in the region. According to building footprint data analyzed by University of Virginia planning students, the number of structures is closer to 150,000 with an estimated value of $23 billion, based on tax records.

Land Use and Development Trends

201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Changes in land use over time will affect the ability to mitigate and respond to hazards, as well as provide opportunity for improvements. The region is growing in population, and growth is being channeled into certain areas based on a number of factors, including topography, local policies, and location of roads and other infrastructure. The most basic trend is conversion of land from undeveloped forest and farmland into residential, commercial, institutional and other more urban uses. The Planning District is experiencing dramatic growth, with single-family residences spreading further into the countryside outside of traditional town centers. One significant driving force is the price of housing in the urban area, leading to increased commuting from outlying counties. Citizens, planners, and public officials are increasingly seeking ways to foster development of vibrant, compact, mixed use communities while protecting the rural countryside. Floodplain maps included in this section show targeted growth areas in each locality. Each locality defines growth areas differently, and applies varying levels of incentives and/or restrictions to concentrate growth in those areas.

Residential: The primary change of use for most land in the region is into some form of residential use. There are a number of estates in the areas that hold large tracts of undeveloped "residential" land, and that last use is not expected to change, as wealthy landowners do not tend to convert to subdivisions quickly.

Agricultural and Forest: Land in farms and forestry is slowly being converted to mainly residential and estate uses across the region. The George Washington National Forest is not expected to change size, but may be open to logging dependent on economic and political pressure.

Charlottesville

More multi-family housing including apartments, condominiums, and townhouses is being built in the City of Charlottesville than in the other localities. This denser growth is focused around

the downtown pedestrian mall, on West Main Street, in the Belmont neighborhood, and along Jefferson Park Avenue. Much of the remaining developable land is located in the southern portion of the city. The City is experiencing extensive infill development along its primary street corridors and within existing neighborhoods.

Albemarle

Albemarle County is experiencing significant growth in the urban ring around Charlottesville. Apartments and strip malls are quickly developing, particularly along the Rivanna River near Route 29 and Route 250 (Pantops Mountain). Albemarle County has strict growth boundaries in place in order to concentrate new growth around existing commercial centers and preserve the rural countryside.

Louisa

Due to its location between Charlottesville, Richmond, and Fredericksburg, Louisa County is expected to experience significant growth in the coming years. Particular areas of residential growth outside of the towns of Mineral and Louisa include Lake Anna, Ferncliff, Gum Spring, and Zion Crossroads. Commercial growth is expected to follow the rapid residential growth in the county.

Fluvanna

Fluvanna County is experiencing rapid growth in its northwest corner and along its western border with Albemarle County, particularly around Lake Monticello, a 4,500-home gated community. The Town of Scottsville, in the southwest part of the County straddling the border of Albemarle County, is also experiencing significant population growth. The county is working on rural preservation zoning to protect the majority of the county from dramatic change.

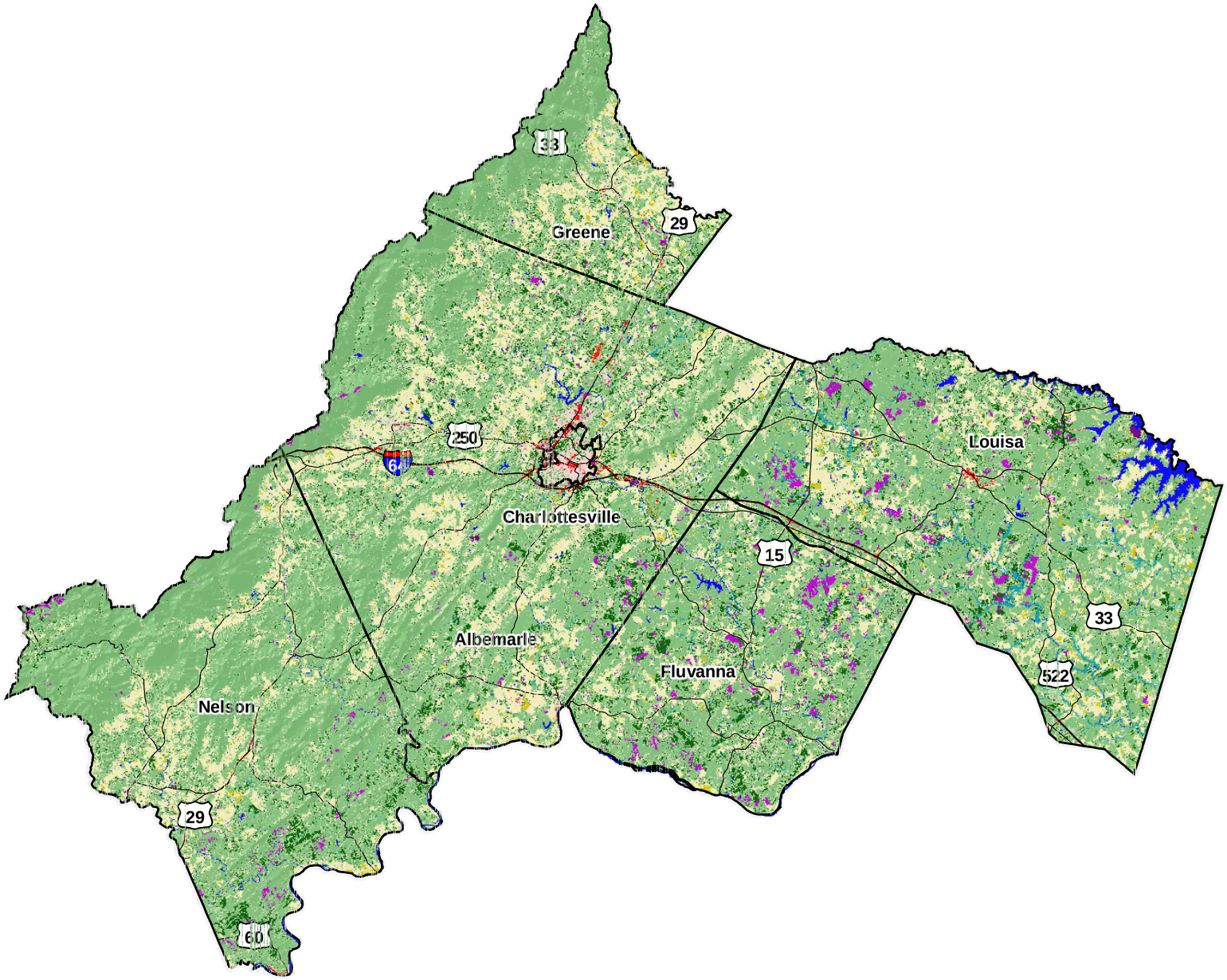
Greene

Greene is expected to continue to grow rapidly, particularly in its southeast corner along Route 29 and Route 33 near the borders with Albemarle and Orange Counties. The Ruckersville area is the target for most of this growth, while Stanardsville is encouraging moderate infill in scale with the small town. As the cost of living in Albemarle County increases dramatically, many area residents are moving to Greene County, where housing and land prices tend to be more affordable. The Shenandoah National Park encompasses the western portion of the County.

Nelson

The Rockfish River Valley, which borders Albemarle County and is home to Wintergreen Resort, is experiencing significant residential growth. The southeastern portion of the County, along the James River is also expected to grow as timber companies develop harvested landholdings. The Lovingston and Colleen areas are targeted to receive commercial and industrial growth. Due to the topography and inaccessibility of some rural parts of Nelson County, large scale growth is unlikely.

TJPD Land Cover



- Open Water
- Low Intensity Residential
- High Intensity Residential
- Commercial/Industrial/Transportation
- Bare Rock/Sand/Clay
- Quarries/Strip Mines/Gravel Pits
- Transitional
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Pasture/Hay
- Row Crops
- Urban/Recreational Grasses
- Woody Wetlands
- Emergent Herbaceous Wetlands

Thomas Jefferson Planning District Commission

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
Source: USGS National Land Cover Data, 1992
January 20, 2005 C:\GIS\HMP\Land Cover.mxd

Infrastructure

The table below, taken from HAZUS-MH, shows the number and value of transportation and utility infrastructure in the Planning District.

	Transportation		Utility	
Locality	Number	Value*	Number	Value*
Total	519 miles and 448 bridges	$3,795	12,451 miles	$1,519
*Value in millions. Source: HAZUS-MH				
Transportation includes highway, rail, bus, and airport.				
Utility includes potable water, wastewater, natural gas, crude and refined oil, electric power, and communication. Includes both lines and buildings.				

The following lists include high water roads in each of the localities. These lists were compiled by local emergency services staff.

High Water Roads-Albemarle, Charlottesville, UVA
21 Curves Road (Old Garth Road)
21 Curves Road at pond
29 North at Camelot
Airport Road at new post office (2 Times – doesn't close road – about to rebuild anyway)
Albemarle Lake Road at Garth Road
Alderman Road at Twyman
Avon Street at Bridge
Ballards Mill Road ¼ mile to 4024 (2 Times)
Route 680 - Browns Gap Road at 240 (2 Times)
Carters Bridge Route 20 South
Cherry Avenue 500-700 block
Cherry Avenue at Johnson School to Cleveland
Clark Road just off 810
Earlysville 700
East High Street 1500 block) (2 Times – doesn't close road)
East Market Street 1100 (3 Times)
Esmont Road (old railroad trestle) (2 Times)
Faulconer Drive at Railroad Bridge (2 Times)
Free Union Road (4933-4920) (2 Times)
Gilbert Station Road at 640 at bridge
Ivy Depot Road / Route 786 at 250 (2 Times)
Route 726 - James River Road at Totier Creek (2 Times)
Jarmans Gap / Carter Street (2 Times – road to be rebuilt soon)
Jefferson Park 1700 at Woodrow
Kingston Drive at West Leigh Drive (2 Times)
Meade Avenue 200

Meade at Fairway over the bridge
Milton Road 2100 at Milton Hills
North Berkshire 2300
Old Ballard Road (2 spots)
Old Ivy Road at Garth Road
Old Ivy Road at underpass and exit ramp (2 Times)
Old Lynchburg Road 1200
Polo Grounds Road east of Route 29 North
Proffit Road at North Fork Rivanna
Stony Point Road at Key West
University Avenue east of Emmet
Route 795 past Route 622
Route 20 south at 708
Route 240 at 680
Route 240 Browns Gap Turnpike
Route 250 west at UPD (clears quickly after rain)
Route 250 bypass at Locust (clears quickly after rain)
Route 29 north At Camelot
Route 29 ¼ mile south of Red Hill (2 Times)
Route 53 ¼ mile past Monticello exit
Route 53 at Jefferson Vineyard (2 Times)
Route 53 at Monticello
Route 6 at Scotland Farm
Route 600 ¼ mile from Route 22
Route 600 at Route 20 (2 Times)
Route 600 Watts Passage Railroad bridge
Route 601 at 810 (2 Times)
Route 601 at Barracks Road
Route 602 and 722
Route 614 1st low spot from Whitehall to Sugar Hollow
Route 620 1/8 mile south of County Line
Route 620 at Buck Island Creek
Route 622 1 ½ mile from 795 (closed)
Route 622
Route 773
Route 761
Route 622 at Hardware River
Route 626 Loan Oak Farm (2 Times)
Route 627 at Albemarle Farm
Route 627 at View Mount Farm (3 Times)
Route 631 and 706 at bridge
Route 631 at Dudley Mountain Road
Route 631 at Gentry Lane (2 Times)
Route 640 at Route 20 (2 Times)
Route 641 Advance Mills Road (little bridge - 4 Times)
Route 667 (2 Times)

Route 672 (2 Times)
Route 674 - Slam Gate/ Heart break Road (2 Times)
Route 680 – Brown's Gap from 240 to 802 (3 Times)
Route 683 – Shelton's Mill (closed)
Route 687 (2 Times)
Route 704 between Route 715 and dead end
Route 706 ½ mile off 631 (2 Times)
Route 708 at KOA (2 Times)
Route 708 at Nutmeg Farm (2 Times)
Route 708 between 627 and 795
Route 712 at 713
Route 712 between 627 and 717
Route 712 between 719 and 631
Route 712 between Route 713 and 795
Route 713 from 20 to dead end (3 Times)
Route 715 between 20 South and 627
Route 715 between 719 and Route 6
Route 723 south of Route 6
Route 726 – James River Road - at Totier Creek (closed)
Route 729 near Route 53 (2 Times)
Route 736 between 635 and 636 (2 Times)
Route 737 between 726 and route 6 (3 Times)
Route 747
Route 723 south of route 6 (closed)
Route 761 between 622 and 620
Route 776 off Route 667 (5 Times)
Route 786 at 250 Ivy Depot Road
Route 795 at 638 (Hardware River)
Route 795 at Ash lawn
Route 795 between 713 and 708 (3 Times)
Route 795 between Route 620 and Route 708 (washed out under pavement – fixed)
Route 795 north of Ash Lawn
Route 810 Mont Fair (2 Times)
Route 810 North 601
Route 810 near Crozet Rescue Squad (stream to Beaver Creek)
Route 810 north route 687
Route 810 Nortonsville Route 628 (2 Times)
Route 810 1st bridge north Garrisons
Sharon Road 1/10 mile to 6 (Route 622)
Sharon Road at the bridge (3 Times)
Totier Road North of Route 626
Watts Passage Road between bridge and railroad track
West Leigh Drive/ Leigh Way (annually) (Has been fixed, but it didn't work)
West Leigh Drive at 250 (2 Times – rare and due to poor ditches)

High Water Roads—Fluvanna County
Hardware Road (Route 646 at HRWMA)
Bremo Road
East River Road (Route 6 – Columbia)
East River Road (Route 6 – Rivanna)
West River Road (Route 6 – Scottsville)
West River Road (Route 6 – Hardware)
North Boston Road (Route 600)
Carysbrook Road (Route 615)
Hunters Lodge Road (Route 631)
Bybees Church Road (Route 613)
Ridge Road (Route 632)
James Madison Highway (Route 15 at Cunningham Creek)
Venable Road (Route 601 at Kent Branch)
Venable Road (Route 601 at Venable Branch)
Route 617 between 15 & 31
Route 630 at Byrd Creek and at Venable Creek (between 601 and 659)
Route 649 at Middle Fork Cunningham
Route 659 between 712 and 626
Route 759 between 250 and dead-end

High Water Roads—Greene County
Smaller Routes 605, 667, 634, 628, 621, 616, 642, 619, 627, 635, 643, and 810

High Water Roads—Louisa County
Route 601 at South Anna River and Cub Creek
Route 604 at South Anna River and at Harris Creek (between 646 and 714)
Route 610 at South Anna River
Route 611 at Flemings Creek
Route 613 at Duckinghole Creek
Route 624 at Christopher Creek (between 623 and 625)
Route 635 at South Anna River
Route 636 at Millington Creek
Route 639 at North Anna River
Route 640 at Fosters Creek (between 613 and 626), South Branch Creek (between 604 and 605), and Deep Creek (between 629 and 647)
Route 644 between 605 and 33
Route 645 at unnamed creek
Route 646 at South Anna River
Route 647 at South Anna River (between 522 and 640)
Route 651 between 669 and Orange County
Route 660 at Happy Creek
Route 663 at Owens Creek
Route 665 at Northeast Creek branch
Route 669 at North Anna River and Fox Branch Creek
Route 683 at Fork Creek

Route 692 at north and south forks of Hickory Creek
Route 695 at South Anna River
Route 697 at unnamed creek
Route 714 at unnamed creek
Route 717 at Central Branch

High Water Roads—Nelson County
Rt 655 .30 miles east of Rt. 151
Rt. 56 west has several spots depending on amounts of rain.
Rt. 56 .10 miles west of Rt. 151
Rt. 56 .15 miles east and west of Rt. 680N.
Rt. 56 .30 miles west of Rt. 712
Rt. 56 .40 miles west of Rt. 814
Rt. 56 .60 miles west of Rt. 687
Rt. 687/North Fork Tye River Road gets most damage to road in each flood due to stream crossings and stream along the roadway.

Critical Facilities

For the purposes of this plan, critical facilities were broken down into three categories: emergency facilities, essential infrastructure, and important community facilities. Each category includes the following facilities.

1. **Emergency facilities**: should be operational directly following a disaster:
   a. Hospitals/Medical clinics
   b. Police stations
   c. Fire stations
   d. Emergency operation centers
   e. Shelters

2. **Essential Infrastructure**: necessary to retain operational status of community; to be restored as quickly as possible following a disaster
   a. Transportation systems—includes roads, bridges, rail, airways
   b. Potable water systems
   c. Wastewater systems
   d. Power—includes lines, buildings, substations
   e. Communication systems—includes towers and lines
   f. Oil and natural gas lines

Important Community Facilities: Structures which may incur significant loss of life, structural damage, and economic loss to the community.
   a. Schools
   b. Churches
   c. Elderly, Disabled, or Assisted Living Facilities
   d. Structures housing Hazardous Materials
      i. Facilities on CERCLIS (Superfund) National Priority List

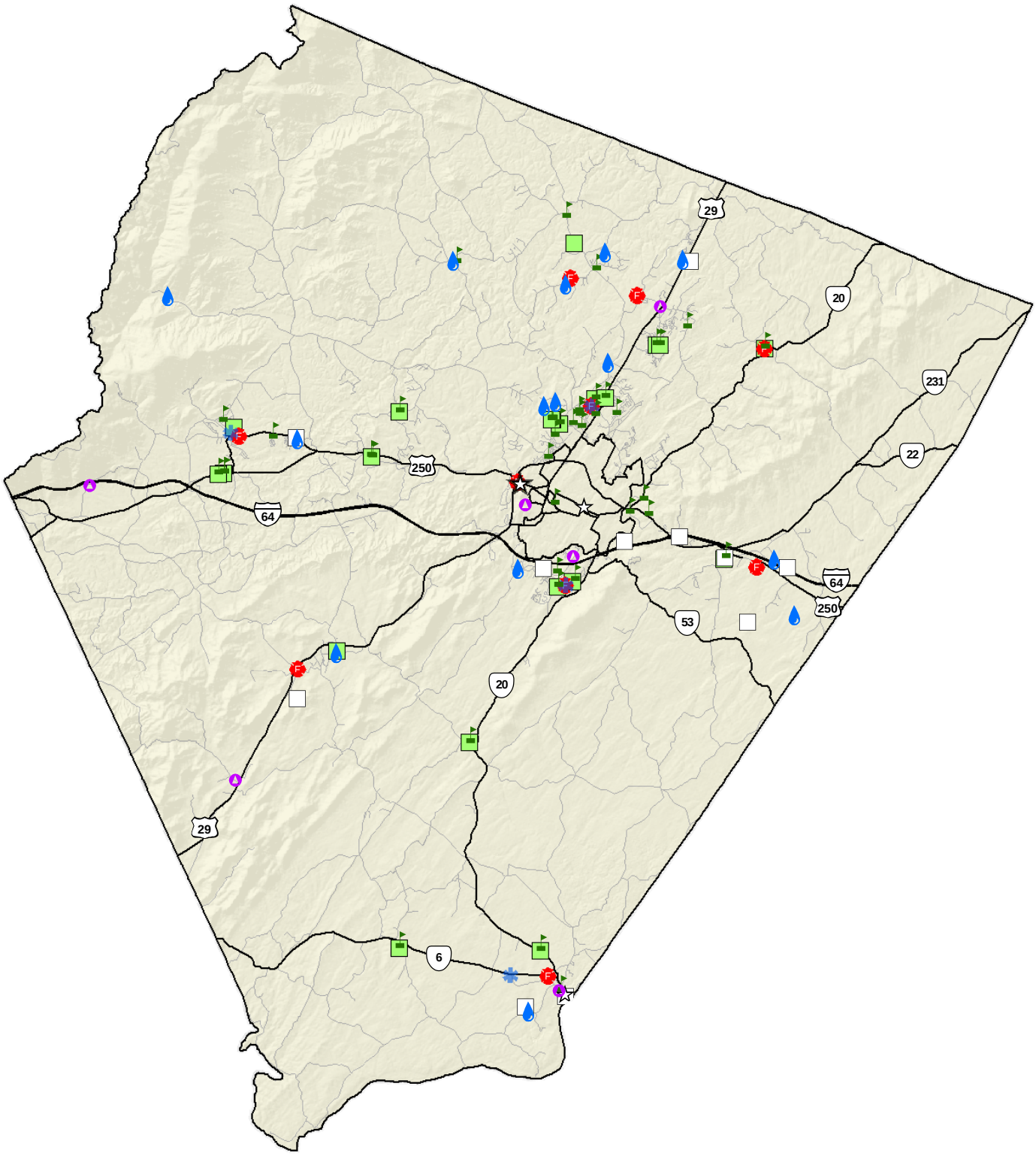
ii. RCRA Large Quantity Generators (facilities that generate over 1000 kg of ignitable, corrosive, reactive, or toxic waste per month)
iii. Facilities on 2002 Toxics Release Inventory (facilities with less than 5 lbs released in 2002 were not included)

The following table shows the number and value of emergency facilities in the Planning District.

Emergency Facilities: Estimated Building Value (in Thousands)						
	Police and Rescue		**Fire**		**Emergency Operations Center**	
Locality	Number	Value	Number	Value	Number	Value
Albemarle	5	$6,510	9	$5,022	0	$0
Charlottesville	4	$5,208	3	$1,674	1	$930
Fluvanna	4	$5,208	4	$2,232	1	$930
Greene	2	$2,604	3	$1,674	1	$930
Nelson	5	$9,114	8	$3,906	1	$0
Louisa	7	$9,114	7	$3,906	1	$930
Total	29	$37,758	33	$18,414	4	$3,720
	Hospitals		**Schools**		**Shelters**	
Locality	Number	Value	Number	Value	Number	Value
Albemarle	0	$0	34	$15,810	19	$8,835
Charlottesville	2	$13,020	25	$11,625	11	$5,115
Fluvanna	0	$0	9	$4,185	5	$2,325
Greene	0	$0	11	$5,115	2	$930
Nelson	3	$0	7	$2,790	14	$2,790
Louisa	0	$0	11	$5,115	1	$465
Total	2	$13,020	96	$44,640	44	$20,460

Source: HAZUS-MH data was used to provide estimated building values in thousands of dollars.

Albemarle Critical Facilities



STF
EMT
WTF
Shelter
Hazmat

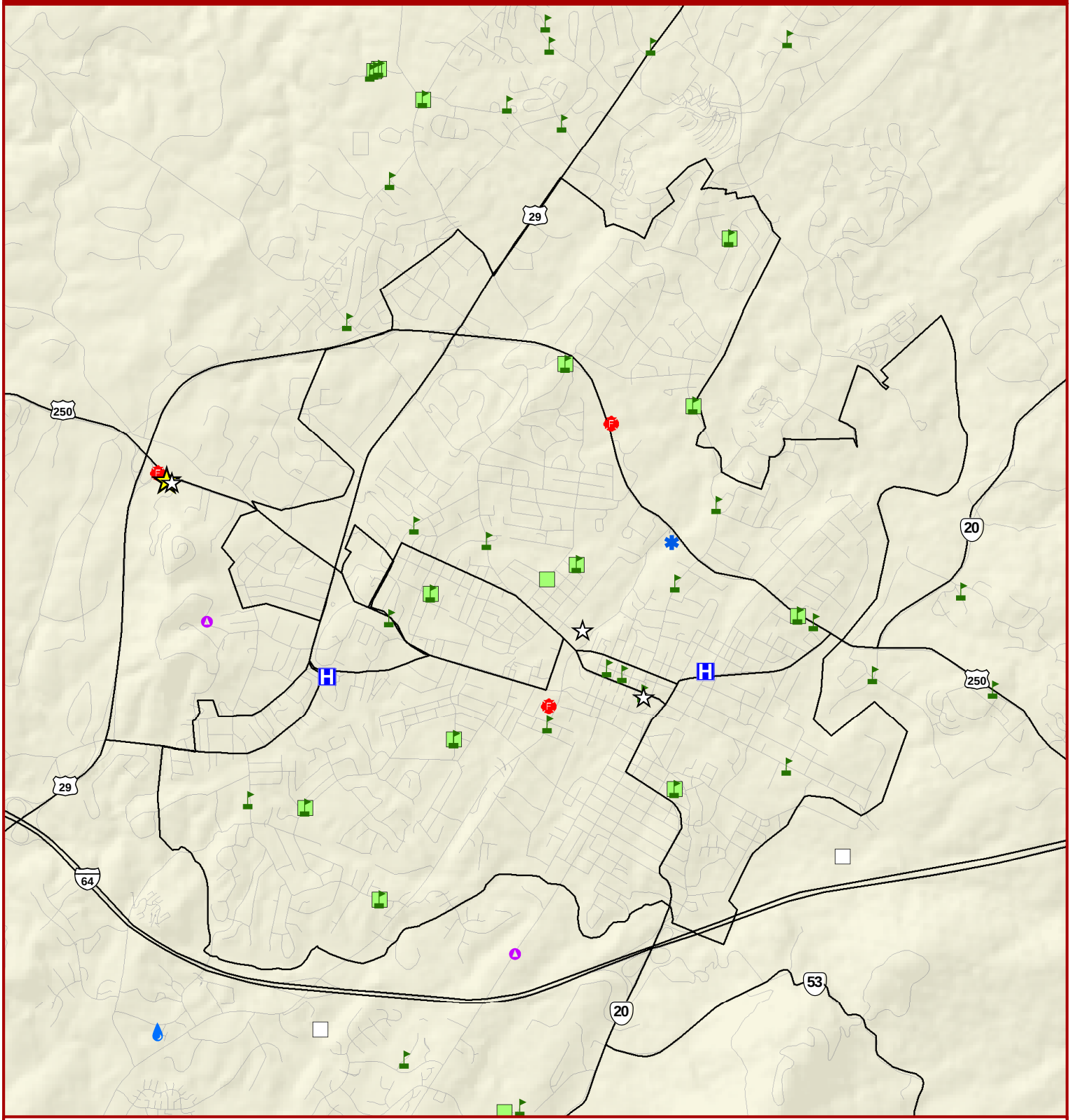
Police
Hospital
Fire Station
School/Daycare
Emergency Communications Center

Emergency Facility: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 2, 2004 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Charlottesville Critical Facilities



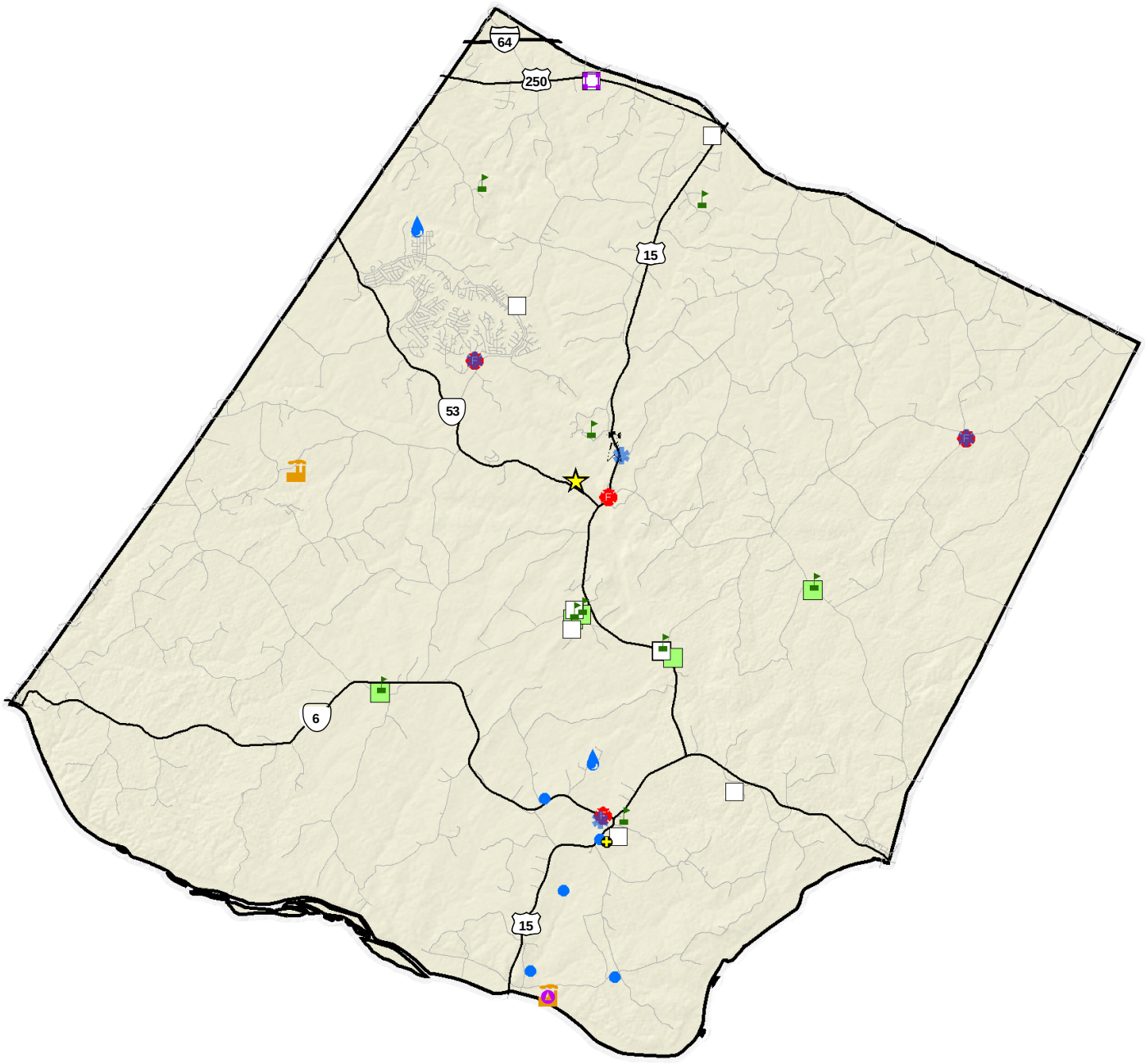
STF
EMT
WTF
Shelter
Police
Hazmat
Hospital
Fire Station
Schools/Daycare
Emergency Communications Center

Emergency Facility: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 2, 2004 C:\GIS\HMP\Chalottesville\Charlottesville Critical Facilitie

Thomas Jefferson Planning District Commission

Fluvanna Critical Facilities



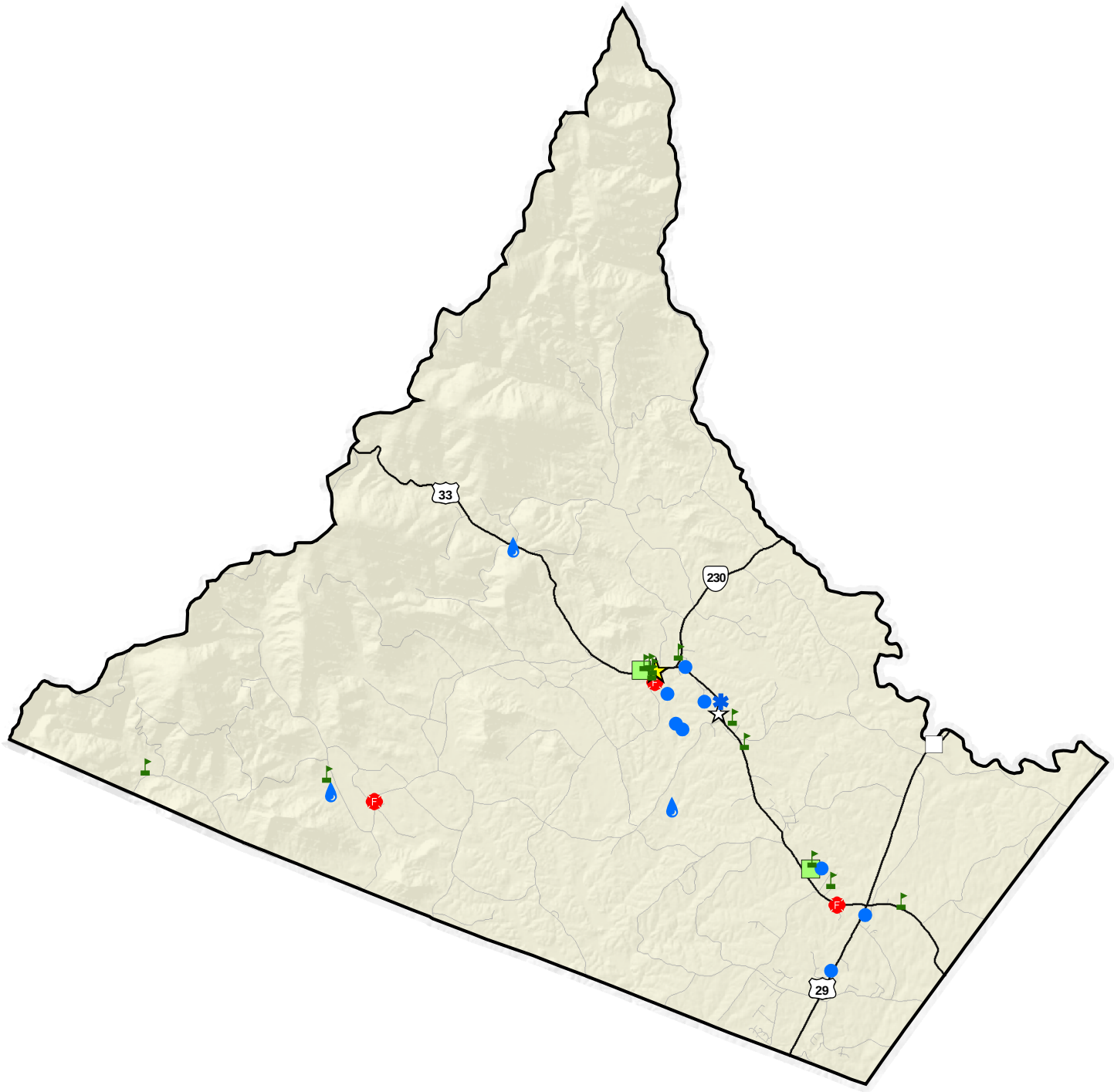
STF
Shelter
School/Daycare
EMT
Hazmat
Correctional Facility
WTF
Fire Station
Public Safety Building
Well
Power Plant
Village Nursing Home
Public Safety Radio Tower

Emergency Facilitie: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 2, 2004 C:\GIS\HMP\Fluvanna\Fluvanna Critical Facilities

Thomas Jefferson Planning District Commission

Greene Critical Facilities



STF
EMT
WTF
Shelter
Hazmat

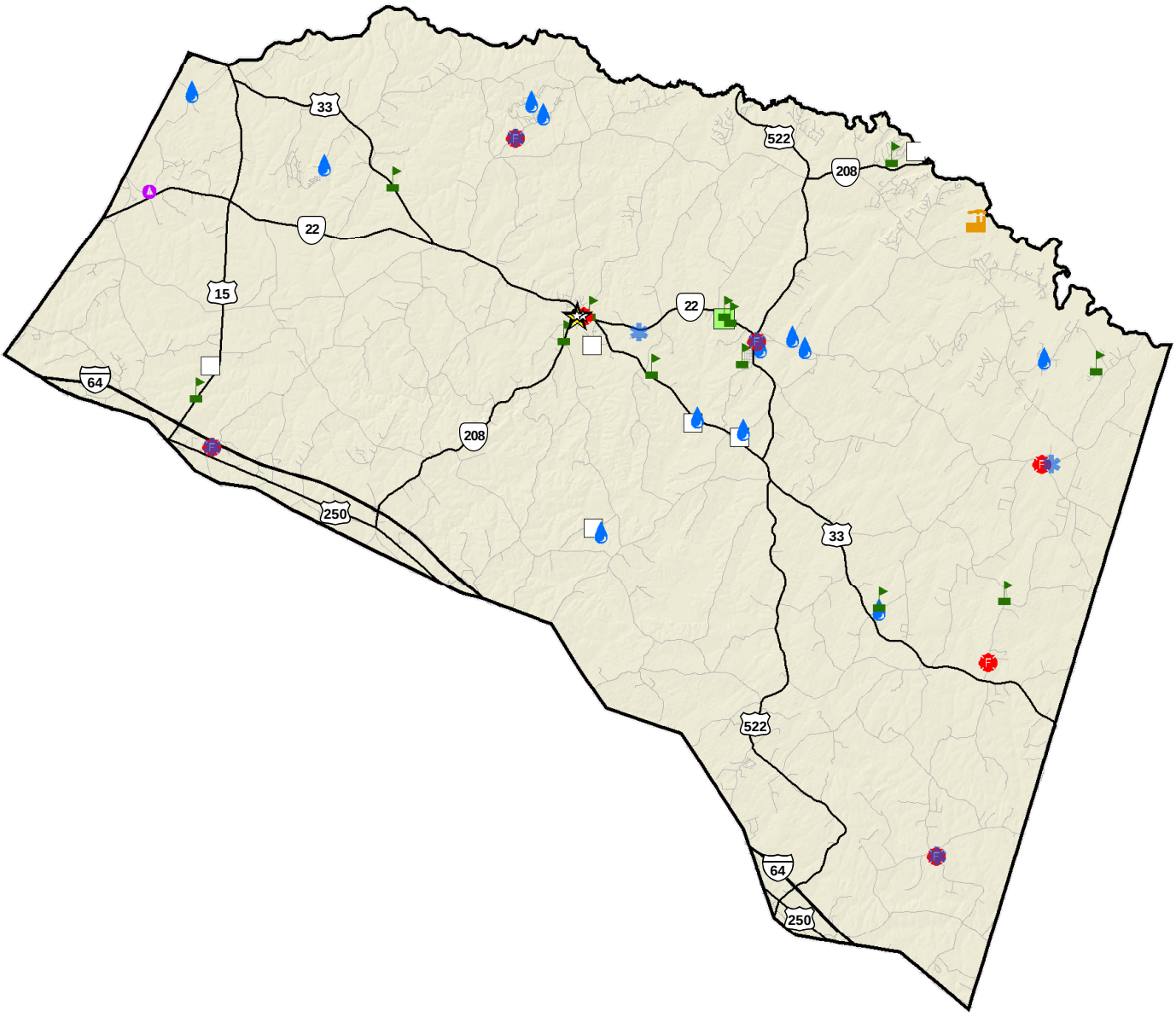
Fire Station
Pump Station
Sheriff's Office
School/Daycare
Emergency Services

Emergency Facility: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 2, 2004 C:\GIS\HMP\Greene\Greene Critical Facilities

Thomas Jefferson Planning District Commission

Louisa Critical Facilities



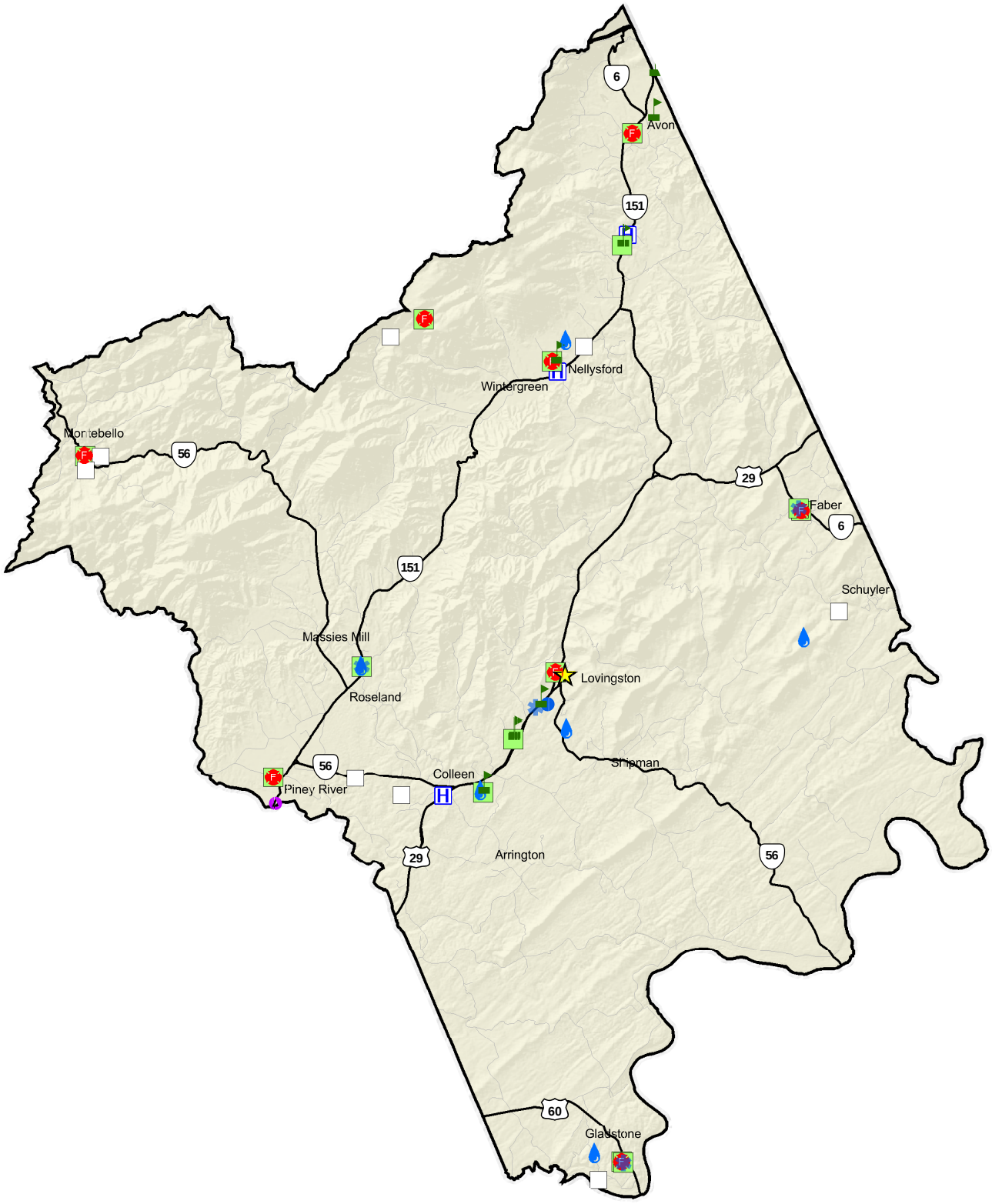
- STF
- EMT
- WTF
- Police
- Hazmat
- Fire Station
- School/Daycare
- North Anna Power
- Office of Emergency Services

Emergency Facility: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 2, 2004 C:\GIS\HMP\Louisa\Louisa Critical Facilities

Thomas Jefferson Planning District Commission

Nelson Critical Facilities



STF
Fire Station
EMT
Pump Station
WTF
Medical Clinic
Shelter
School/Daycare
Hazmat
Emergency Services & Police

Emergency Facility: Critical to have operational during & directly following a disaster.
Essential Infrastructure: Necessary to retain operational status of community.
Important Community Facility: May incur significant loss of life, structural damage, and economic loss to the community.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 14, 2004 C:\GIS\HMP\Nelson\Nelson Critical Facilities

Thomas Jefferson Planning District Commission

Estimating Potential Loss

201.6(c)(2)(ii)(B): The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate…

The following section includes an inventory of assets and estimation of loss for the following hazards deemed to pose the most significant risk to the Planning District:

1. Flood
2. Severe Winter Storm
3. Hurricane
4. Tornado
5. Windstorms
6. Drought
7. Earthquake
8. Wildfire
9. Dam Failure

Flood

The Planning District has an estimated 150,000 structures as shown by area building footprints. Using each locality's tax data, the total value of structures within the Planning District is over $23 billion. To find the potential loss of buildings due to floods, floodplain data was overlaid on building footprints, addresses, or tax data. There is approximately $190 million of property located within the floodplain; $154 million of that is residential. Only 2% of the structures, representing less than 1% of the total value, are located in the floodplain. To find the percentage of the population residing within a floodplain, the number of residential structures within the floodplain was multiplied by the average number of persons per household for each locality. The results showed that of almost 200,000 people in the region, 3,225 residents are located within a floodplain, representing 1.1% of the total population.

Inventory Assets: Total PDC
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	72,008	1,342	1.86%	$11,055,422,000	$154,127,268	1.39%	199,648	3,225	1.62%
Non-Residential	872	163	18.7%	$1,970,887,000	$34,731,210	1.76%			
Commercial		45		$1,437,855,000	$26,825,910				
Industrial		0		$218,940,000					
Agricultural		93		$33,461,000	$7,806,700				
Religious/Non-profit		8		$106,736,000	$98,600				
Government		3		$21,784,000	undetermined				
Education		0		$152,111,000					
Utilities		14			$1,123,300				
Total	72,880	1505	2.07%	$13,026,309	$188,858,478	1.45%	199,648	3,225	1.62%

While GIS data, tax data, and floodplain shapefiles were used to determine the location of these structures, some of these structures may have since been relocated, elevated, or floodproofed in accordance with National Flood Insurance Program (NFIP) standards. This information may be included in future updates as data becomes available. In this report, the term floodplain, 100-year floodplain, and Special Flood Hazard Area (SFHA) are used interchangeably. The following table provides information, by locality, from the National Flood Insurance Program.

National Flood Insurance Program Statistics							
Locality	Entry into NFIP	Current Effective FIRM	# of Policies	Insurance Whole	Insurance Premium	Total Losses	Payments
Albemarle	1980	2004	112	$21,855,700	$67,070	33	$262,056.84
Charlottesville	1979	2004	41	$7,005,000	$26,133	33	$22,177.20
Fluvanna	1978	1978	17	$2,822,400	$6,390	12	$199,602.96
Greene	1984	1984	21	$3,095,200	$5,569	13	$36,760.98
Louisa	1989	1997	16	$2,396,800	$5,424	0	$0.00
Nelson	1978	1978	82	$11,697,500	$5,868	25	$134,715.00

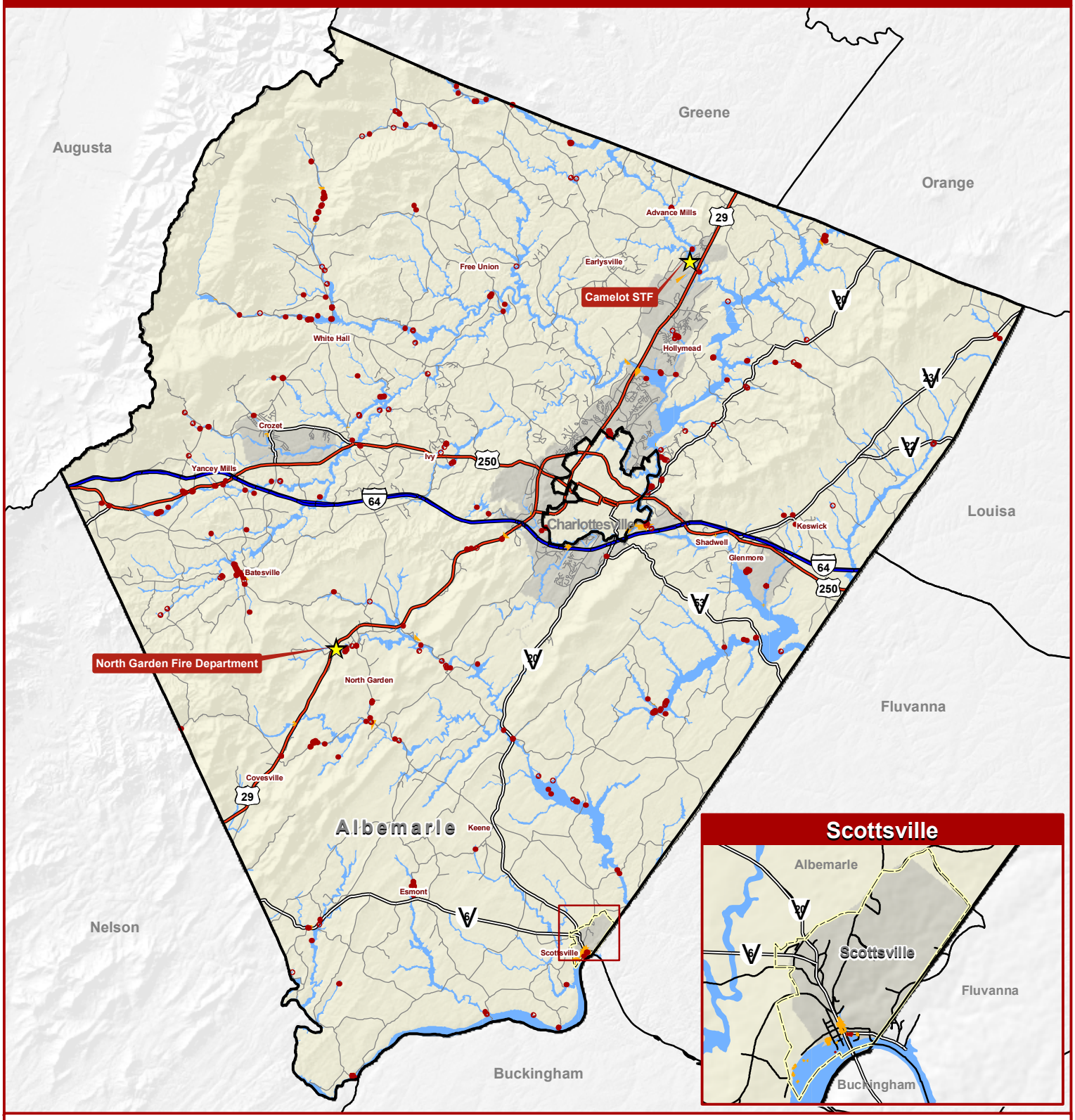
Albemarle County

Inventory Assets: Albemarle
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	29,687	325	1.09%	$5,008,352,000	$52,699,700	1.05%	84,186	935	1.11%
Non-Residential	703	72		$2,564,497,600	$83,133,100	3.24%			
Commercial		64		$974,058,100					
Industrial									
Agricultural				$1,590,439,500					
Religious/Non-profit		1							
Government		1							
Education									
Utilities		6							
Total	30,390	389	1.28%	$7,572,849,600	$135,832,800	1.79%	84,186	934.52	1.11%

There are 325 residential and 72 non-residential structures within the floodplain in Albemarle County, for a total value of almost $136 million. Approximately 935 residents live in the floodplain. FEMA has just released new DFIRMs for Charlottesville and Albemarle, and these data were used even though locality review is not yet complete. The DFIRMs were overlaid on building footprint and tax data to determine which structures were at risk. The North Garden Fire Department is the only emergency facility in the hazard area. It is valued at $514,100 but has been elevated on fill and is therefore not at risk. Sewage and water treatment plants located within the floodplain are the Scottsville Sewage Treatment Plant (STP), the Keswick STP, the Glenmore STP, the Rivanna Authority STP in Camelot, the Keswick STP, the Rivanna Water and Sewer Authority STP, and the South Fork Rivanna Water Treatment Facility. Southwood Mobile Homes Estates has an onsite treatment facility which is also located within the floodplain. The map on the following page identifies structures in the floodplain.

Albemarle Structures in Flood Hazard Areas



- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- Scottsville Boundary
- 100-year Floodplain

At Risk Properties		Total Value	
2	Critical Facilities	$	Undetermined
64	Non-Residential	$	83,133,100
325	Residential	$	52,699,700

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 20, 2005 C:\GIS\HMP\Albemarle\Albemarle Buildings Floodplain

Thomas Jefferson Planning District Commission

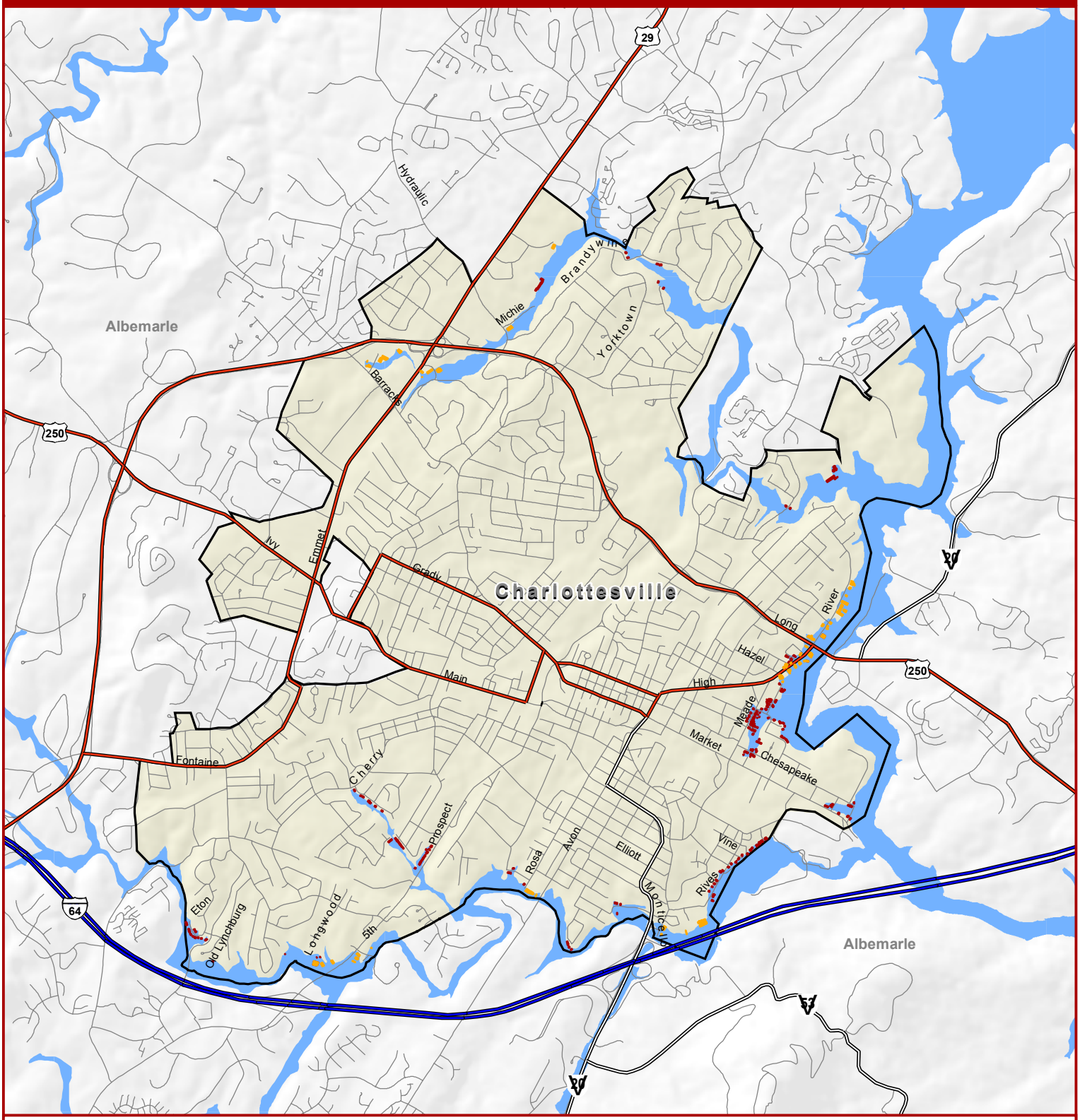
City of Charlottesville

Inventory Assets: Charlottesville
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	28,968	186	0.64%	$4,914,292,530.30	$12,647,587	0.26%	40,099	207	0.52%
Non-Residential		49		$6,706,716,043.00	$16,034,781	0.24%			
Total	28,968	235	0.64%	$11,621,008,573	$28,682,368	0.25%	40,099	207	0.52%

Charlottesville estimates were derived with the same methodology used for Albemarle County. 186 residential and 49 non-residential structures appear to be located within the floodplain, with building values totally $12 and $16 million, respectively. Approximately 207 people reside within the flood hazard area. The following map show the number and location of structures located in the floodplain.

Charlottesville Structures in Flood Hazard Areas



- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- 100-year Floodplain

At Risk Properties		Total Value
0	Critical Facilities	$ 0
49	Non-residential	$ 16,034,781
186	Residential	$ 12,647,587

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
November 30, 2004 C:\GIS\HMP\Charlottesville\Charlottesville Buildings Floodplain

Thomas Jefferson Planning District Commission

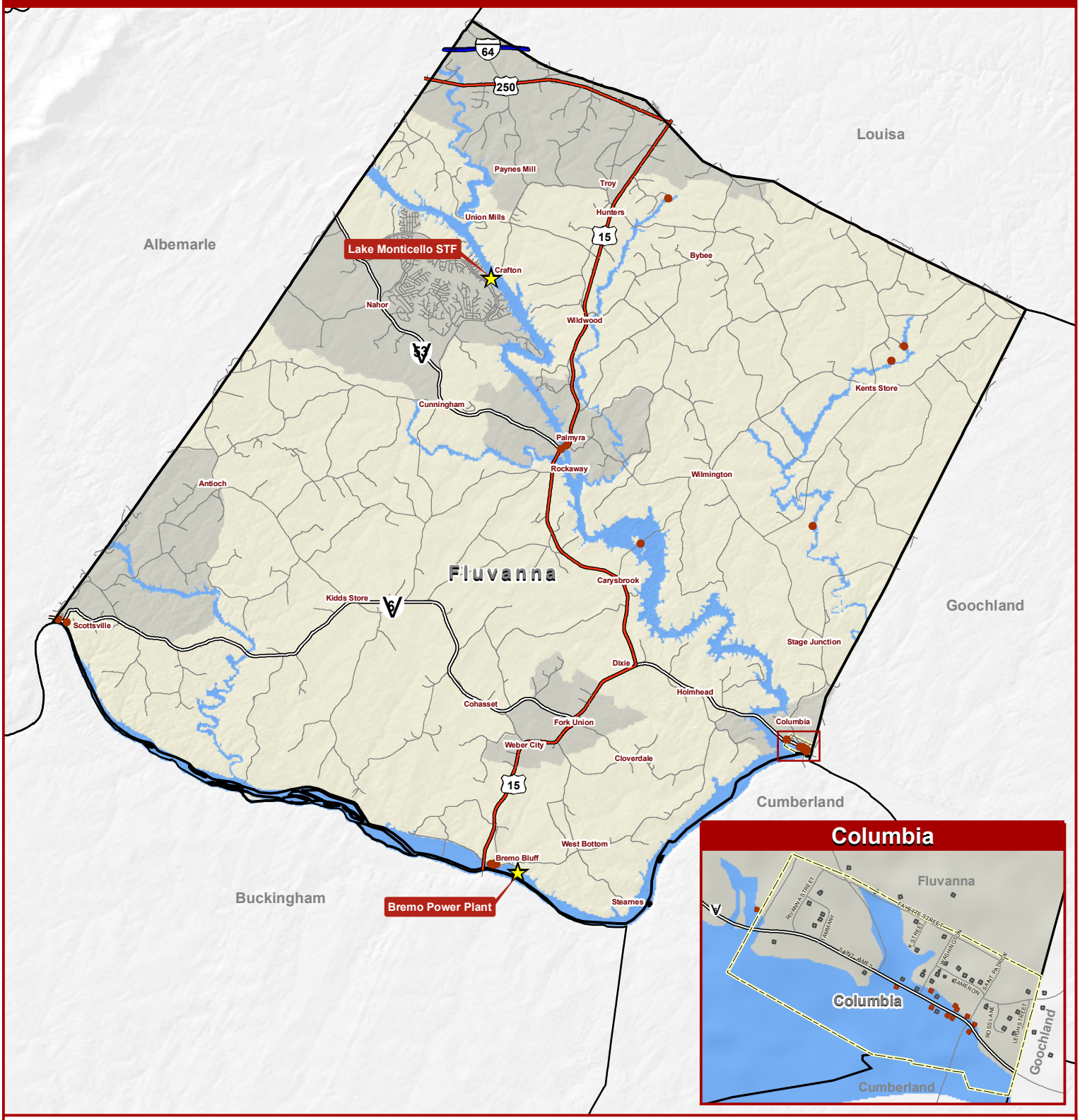
Fluvanna County

Inventory Assets: Fluvanna
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	7,824	25	0.32%		$1,690,351		20,047	67	0.34%
Non-Residential	29	2			$18,205,168				
Total	7,853	27	0.34%	$1,096,235,000	$19,895,519	1.81%	20,047	67	0.34%

The analysis for Fluvanna County was based on limited data. Using floodplains digitized by the Planning District Commission and building footprints, 27 structures were found to be in the floodplain. Fluvanna is still in the process of transitioning to an E-911 system. Revisions are still underway for tax data and many improvement values were not linked to associated addresses. After finding 11 out of 25 residential structures, an average of these properties was used to find a total value of structures as risk, with a final value of $1.7 million in residential structures at risk. Non-residential structures include the Bremo Power Station and the Lake Monticello Sewage Treatment Plant, cumulatively valued at over $18 million. Only 67 people are estimated to live within the floodplain. Structures that are located within the 100-year floodplain can be found in Scottsville and Bremo Bluff along the James River, mostly in Palmyra and Columbia along the Rivanna River, and two structures along Kent's Branch (Venable Creek). Most recently, development has occurred around Lake Monticello, which itself is not located within the floodplain but is in proximity to the Rivanna River. The map on the following page shows the location and value of structures located in the floodplain.

Fluvanna Structures in Flood Hazard Areas



Columbia

- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- Columbia Boundary
- 100-year Floodplain

At Risk Properties		Total Value
2	Critical Facilities	$ 18,205,168
0	Non-Residential	$ 0
27	Residential	$ 1,690,351

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 20, 2005 C:\GIS\HMP\Fluvanna\Fluvanna Buildings Floodplain

Thomas Jefferson Planning District Commission

Columbia Structures in Flood Hazard Areas

- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- Columbia Boundary
- 100-year Floodplain

At Risk Properties		Total Value
0	Critical Facilities	$ 0
0	Non-Residential	$ 0
10	Residential	$ 676,140

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 20, 2005 C:\GIS\HMP\Fluvanna\Fluvanna Buildings Floodplain

Thomas Jefferson Planning District Commission

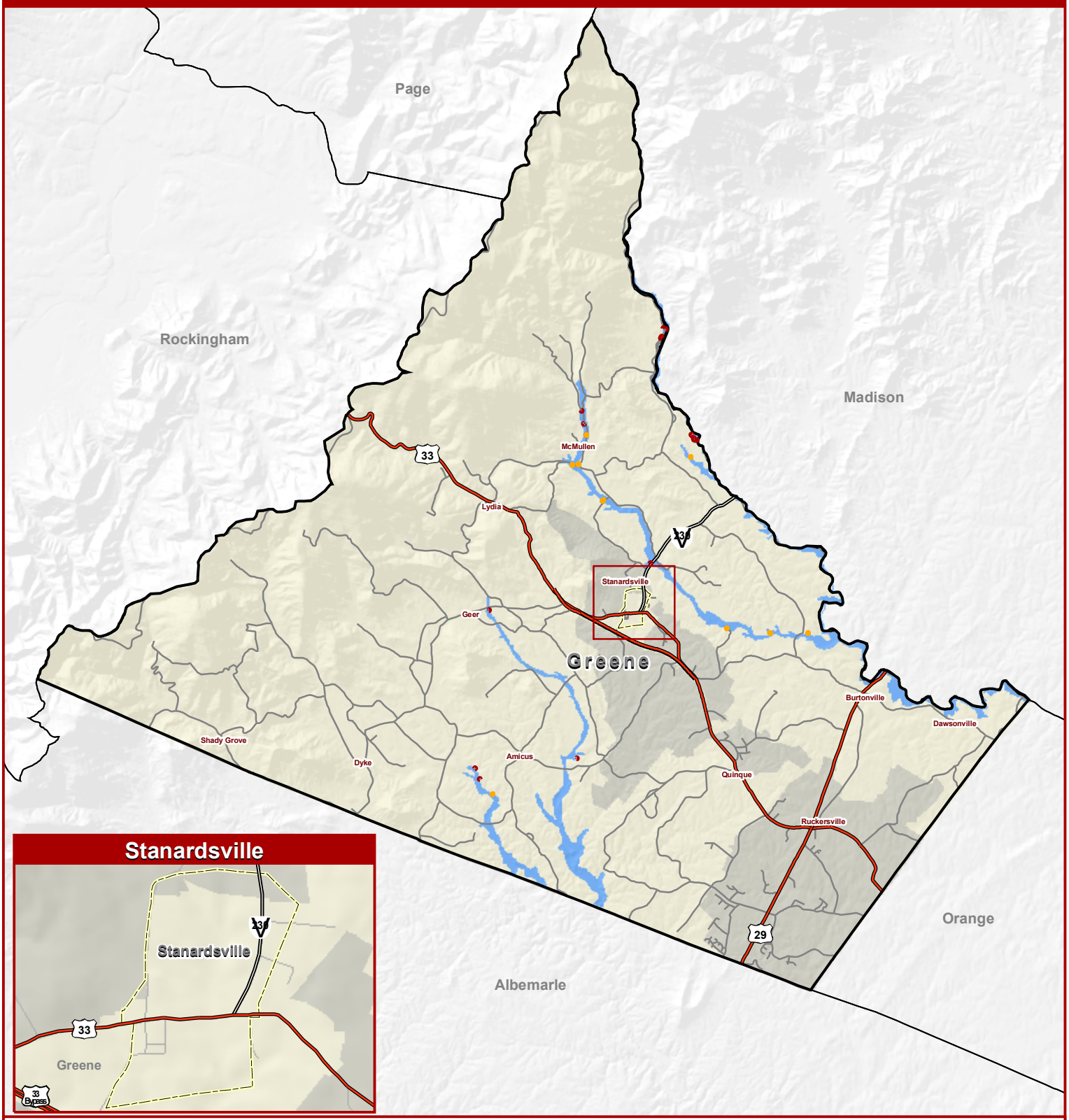
Greene County

Inventory Assets: Greene
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	5,723	23	0.4019	$729,924,000	$1,637,700	0.22%	15,244	62	0.41%
Non-Residential	28	13		$79,826,000	$3,722,200	4.66%			
Commercial	21		0						
Industrial	3		0						
Agricultural	0	11			$2,500,300				
Religious/Non-profit	2	1	0.5		$98,600				
Government	2		0						
Education	0								
Utilities		1			$1,123,300				
Total	5,751	36	0.23%	$809,750,000	$5,359,900	0.66%	15,244	62	0.41%

Greene County has 23 residential structures and 13 non-residential buildings at risk for a total value of just over $5 million. Only 62 people are estimated to live in the floodplain, and no critical facilities were found to be at risk. Waterways prone to flooding in the county are the Conway/Rapidan River, Swift Run, and Preddy Creek. The following map shows the location of at-risk structures.

Greene Structures in Flood Hazard Areas



Stanardsville

- At Risk Critical Facility
- At Risk Non -Residential Structure
- At Risk Residential Structure
- Targeted Development Area
- 100-year Floodplain

At Risk Properties		Total Value
0	Critical Facilities	$ 0
12	Non-Residential	$ 2,598,900
23	Residential	$ 1,637,700

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 01, 2004 C:\GIS\HMP\Greene\Greene Buildings Floodplain

Thomas Jefferson Planning District Commission

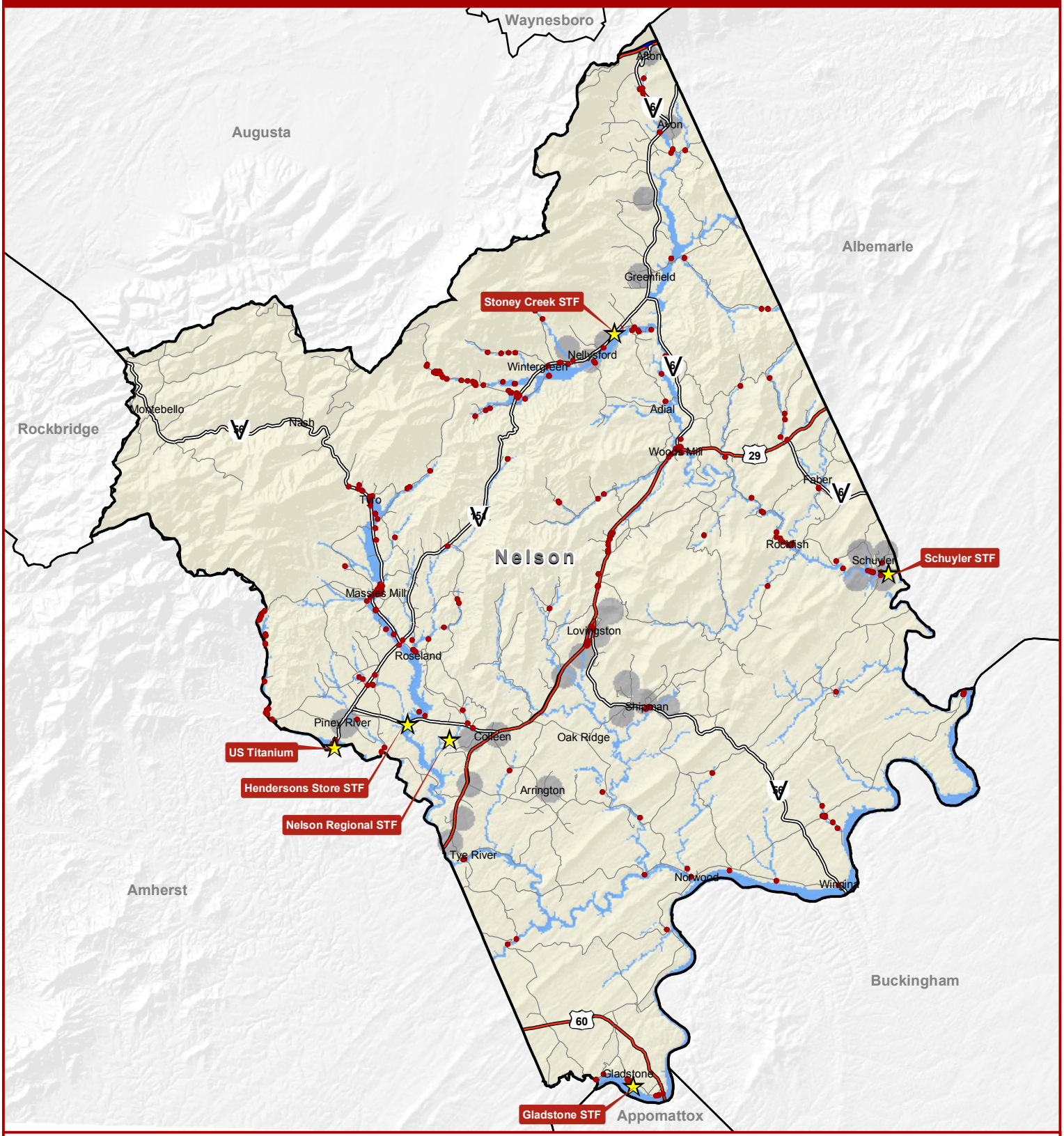
Nelson County

Inventory Assets: Nelson
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	7,378	358	4.85%	$727,726,100	$44,708,830	6.14%	14,445	866	6.00%
Non-Residential	102	13		$269,484,138					
Commercial	22		0	$5,451,000					
Industrial	3		0						
Agricultural	3		0	$157,556,700					
Religious/Non-profit	66	6	9.09%						
Government	1	2	2						
Education	7								
Utilities		6							
Total	7,480	371	4.96%	$997,210,238			14,445	866	6.00%

Finding data for Nelson County was difficult. Floodplains digitized by the Planning District Commission were used. Building footprints were available, but tax data could not be correlated to these footprints due to a lack of address databases. Results from the table above show that at least $44 million of improvements lie within the floodplain, and 5% of all residential structures are at risk of flooding, as well as 866 people. The values were derived from tax data. The map on the following page illustrates the location and value of structures in the floodplains.

Nelson Structures in Flood Hazard Areas



- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- 100-year Floodplain

At Risk Properties		Total Value	
7	Critical Facilities	$	Undetermined
8	Non-Residential	$	Undetermined
358	Residential	$	44,708,830

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
December 02, 2004 C:\GIS\HMP\Nelson\Nelson Buildings Floodplain

Thomas Jefferson Planning District Commission

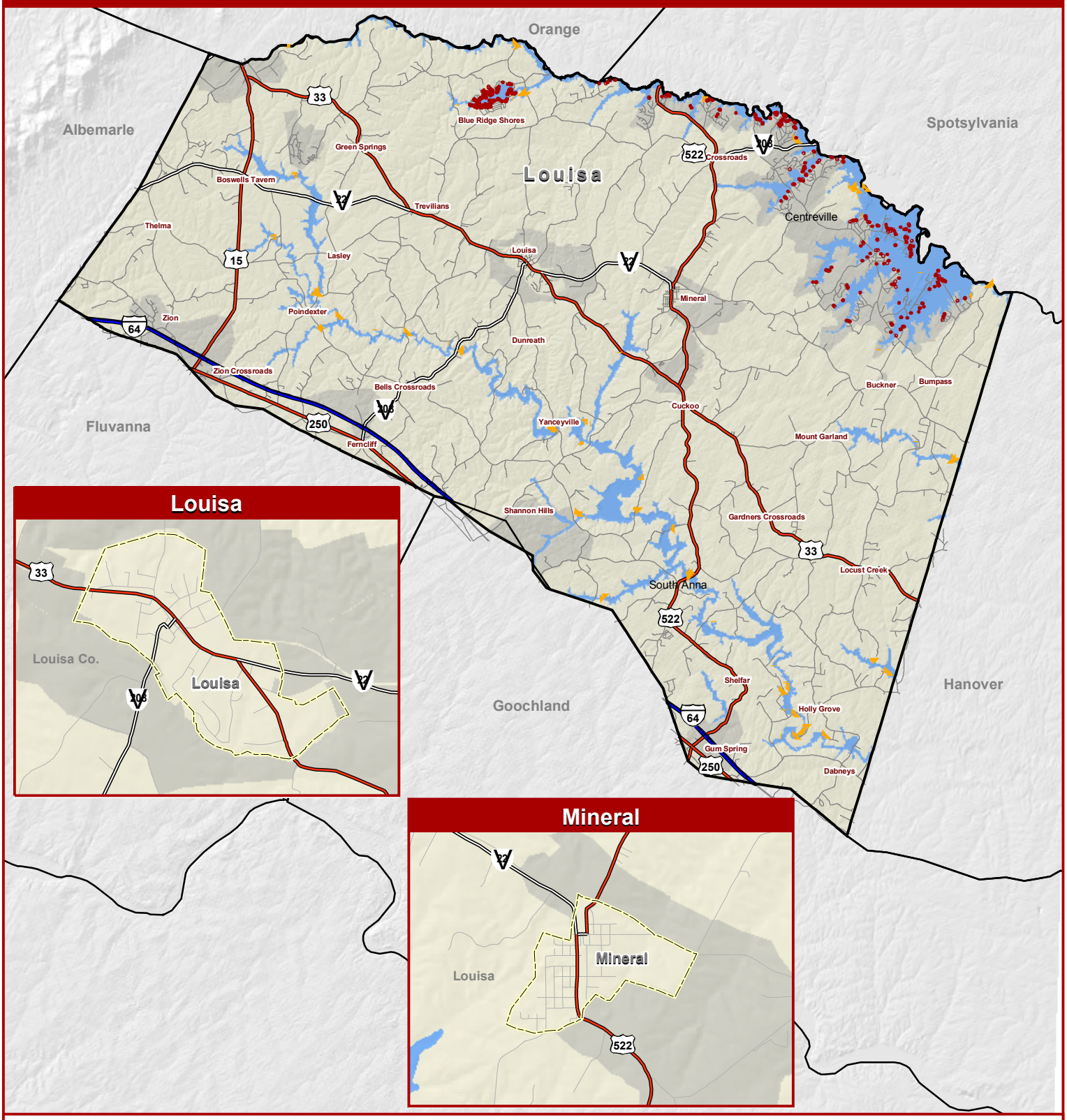
Louisa County

Inventory Assets: Louisa
Hazard: Flood

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**	**$ in Locality**	**$ in Hazard Area**	**% in Hazard Area**	**# in Locality**	**# in Hazard Area**	**% in Hazard Area**
Residential	11,120	425	3.82%	$1,386,118,000	$40,743,100	2.94%	25,627	1088	4.25%
Non-Residential	89	92		$101,551,000	$6,132,400	6.04%			
Commercial	20	9			$826,000				
Industrial	9								
Agricultural	0	82			$5,306,400				
Religious/Non-prof	60								
Government	0								
Education	0								
Utilities		1							
Total	11,209	517	4.61%	$1,487,669,000	$46,875,500	3.15%	25,627	1088	4.25%

Louisa has an estimated 425 residential structures located within the floodplain and 92 non-residential buildings valued at $41 million and $6.1 million, respectively. These structures account for over 3% of the total value of buildings, and 4.25% of all residents live in a flood hazard area. These numbers were derived by overlaying the DFIRM data from FEMA with the 1999 parcel data provided by the county. 82 of the 92 non-residential structures are for agricultural use. North and South Anna Rivers are most likely to flood. The total number of non-residential structures in the locality was derived from HAZUS-MH and appears to drastically undercount non-residential structures. The map on the following page shows the location and value of at-risk structures.

Louisa Structures in Flood Hazard Areas



- At Risk Critical Facility
- At Risk Residential Structure
- At Risk Non-Residential Structure
- Targeted Development Area
- Town Boundary
- 100-year Floodplain

At Risk Properties		Total Value	
0	Critical Facilities	$	0
91	Non-Residential	$	6,132,400
425	Residential	$	40,743,100

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
January 18, 2006 C:\GIS\HMP\Louisa\Louisa Buildings Floodplain

Thomas Jefferson Planning District Commission

Repetitive Loss Structures

A repetitive loss structure, as defined by FEMA, is a property that is currently insured through the National Flood Insurance Program, for which two or more losses (occurring more than 10 days apart) of at least $1,000 each have been paid within any 10-year period since 1978.

There are currently nine repetitive loss structures in the Planning District; 2 in Albemarle County, 3 in the City of Charlottesville, 3 in Fluvanna County, and 1 in Nelson County. Their total claimed losses amount to $417,152. All nine of the properties have reported claims at least twice, four have made claims three times, two properties have been flooded four times, and one property has been flooded five times. One property in Charlottesville is a non-residential structure that has been flooded four times, at a total cost of almost $100,000. These structures may be important to target for possible mitigation activities. The following chart shows claims data reported to the NFIP:

Repetitive Loss Structures										
County	Type	Imp Value	Mitigated	Insured	Total Loss 1	Total Loss 2	Total Loss 3	Total Loss 4	Total Loss 5	Total— All Losses
Alb	Non-Resident	n/a	No	No	$50,000.00	$24,843.47				$74,843.47
Alb	Single Family	$83,250	No	No	$7,574.36	$6,602.19	$4,404.06	$4,505.00	$18,846.10	$41,931.71
Cville	Non-Resident	n/a	No	Yes	$37,516.71	$27,123.99	$6,611.96	$21,666.56		$92,919.22
Cville	Single Family	$28,500	No	Yes	$1,897.82	$12,594.79				$14,492.61
Cville	Single Family	$40,500	No	Yes	$6,947.43	$15,397.15				$22,344.58
Fluv	Single Family	$50,100	No	No	$8,765.12	$12,923.06				$21,688.18
Fluv	Single Family	$42,000	No	No	$36,093.12	$16,536.00				$52,629.12
Fluv	Non-Resident	$170,600	No	No	$35,482.37	$8,249.45	$35,594.63			$79,326.45
Nelson	Single Family	$70,000	No	Yes	$9,495.59	$1,087.40	$6,394.09			$16,977.08
										$417,152.42

Severe Winter Storms and Extreme Cold

Although winter storms do pose a significant risk to the region, storm events are not confined to specific parts of the Planning District. In general, the western part of the Planning District at higher elevations experiences greater snowfall. Remote housing clusters in the more mountainous areas of the Planning District are at a greater risk of being isolated as roads become impassable.

The previous Hazard Analysis section contains a description of notable historic winter storm events and a summary of damage from winter storms. From historical data, it can be projected that over the next ten years the region will be hit by 30-40 winter storms causing several deaths and dozens of injuries. Property loss will most likely be greater than $9 million. As the population grows and more structures are built that number will increase.

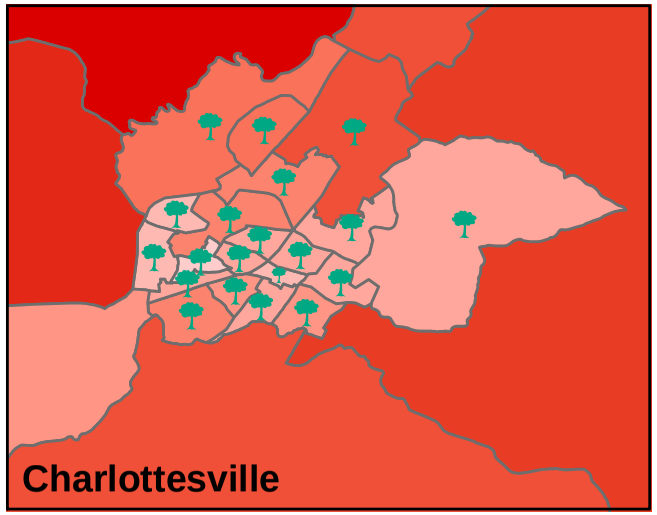
Hurricanes

The following estimate is drawn from HAZUS-MH. While HAZUS-MH does provide an estimate for future damage, it should be noted that this is simply an estimate based on several criteria and may contain some erroneous data. HAZUS-MH loss estimation models were run for three historic storms: Hazel in 1954, Fran in 1996, and Isabel in 2003. Although dollar values are not adjusted to accommodate for inflation, an average expected loss can be determined by averaging the impacts of these three storm events. The table shown below represents data collected from HAZUS-MH.

Storm	Hazel (1954)	Fran (1996)	Isabel (2003)
Building Damage (Count)	1013	1	80
Buildings Destroyed	88	0	0
Debris (tons)	4,752,178	1,304,795	6,570,219
Households Displaced	109	0	0
People Needing Shelter	27	0	0
Direct Property Loss	$84,343,330	$255,990	$36,543,350
Indirect Economic Loss	$10,117,990	$1,220	$681,910
Total Loss	$94,461,320	$257,210	$37,225,260
Note: Hurricane Isabel was not technically defined as a hurricane when it came through the Planning District. In order to run the model in HAZUS-MH, 10mph was added to the maximum sustained winds.			

Averages of each storm suggest that a minimum of $44 million dollars worth of damage and over $4 million tons of debris can be expected over a 50-year period. As development increases, these numbers are very likely to increase. The following maps show residential, commercial, and industrial losses in thousands of dollars as defined by HAZUS-MH.

Thomas Jefferson Planning District
Estimated Loss and Damage
Hurricane Isabel



Legend

Total Loss - : Residential ($K)

- <= 35
- 35 - 293
- 293 - 552
- 552 - 811
- 811 - 1070
- 1070 - 1328
- 1328 - 1587
- 1587 - 1846
- 1846 - 2104
- 2104 - 2363
- 2363 - 2622

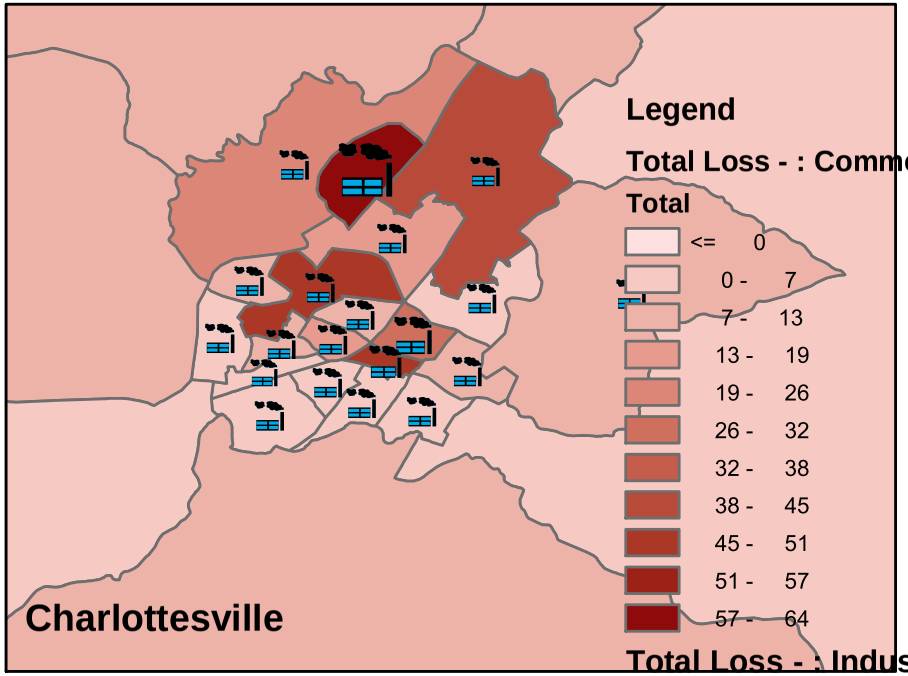
Debris: Tree Volume (1 cu. yards)

- <= 1135
- 1135 - 414,343
- 414,343 - 827,550
- 827,550 - 1,240,758
- 1,240,758 - 1,653,965
- 1,653,965 - 2,067,173
- 2,067,173 - 2,480,380

10 5 0 10 Miles

N W E S

Thomas Jefferson Planning District
Estimated Loss and Damage
Hurricane Isabel



Total Loss - : Industrial ($K)

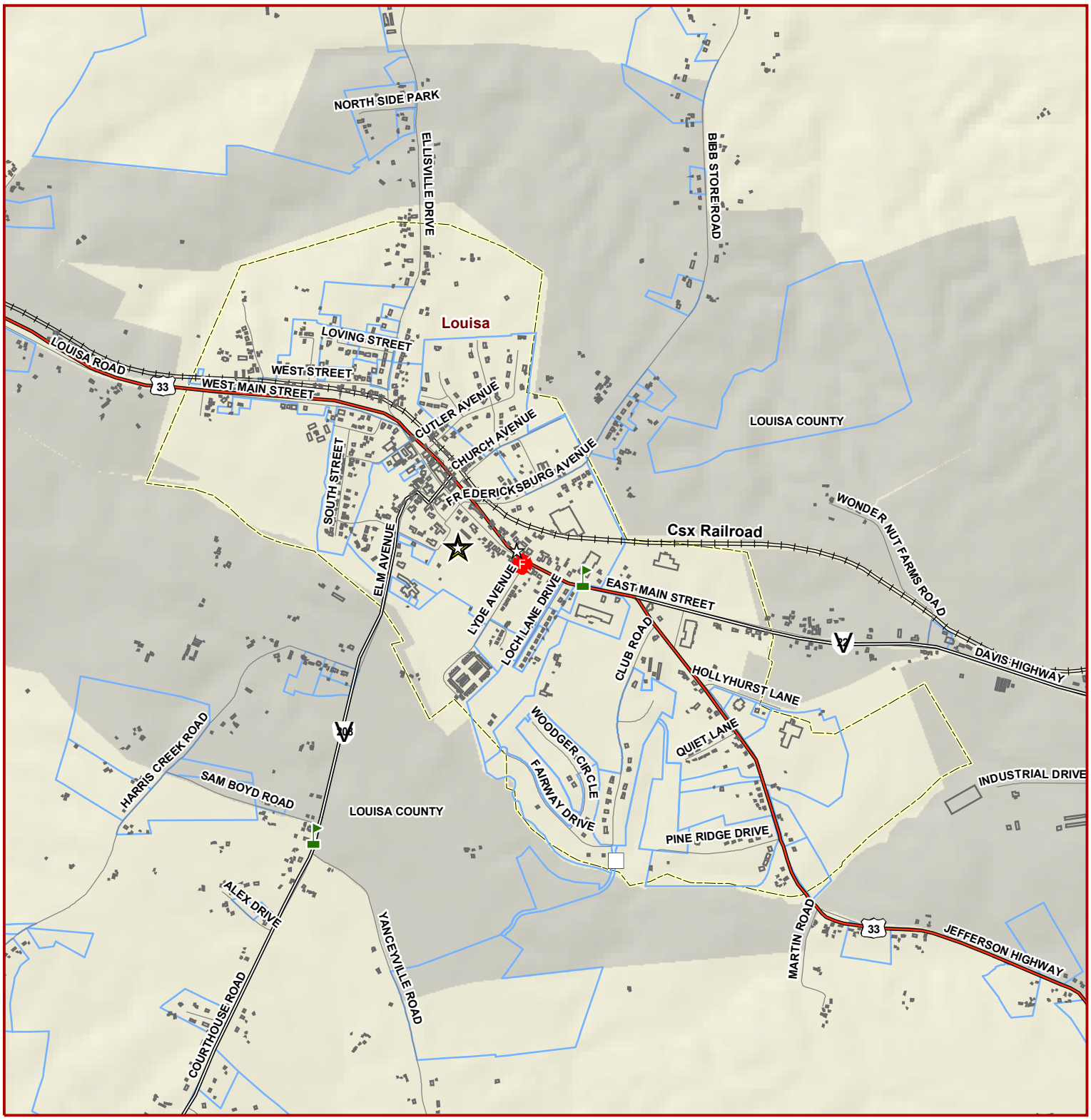
Total

<= 0
0 - 2
2 - 3
3 - 5
5 - 7
7 - 8
8 - 10
10 - 11
11 - 13
13 - 15
15 - 16

7.5 3.75 0 7.5 Miles

N
W E
S

Louisa Vulnerability to Winds and Winter Storms



STF
EMT
WTF
Police
Hazmat
Fire Station
School/Daycare
Shelter
Pump Station
Emergency Services & Police
Subdivision Boundary
Targeted Development Area
Building Footprint

Town maps include neighborhoods, critical facilities, buildings, and major roads, all of which are vulnerable to high winds and winter storms.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
march 8, 2006 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Stanardsville Vulnerability to Winds and Winter Storms

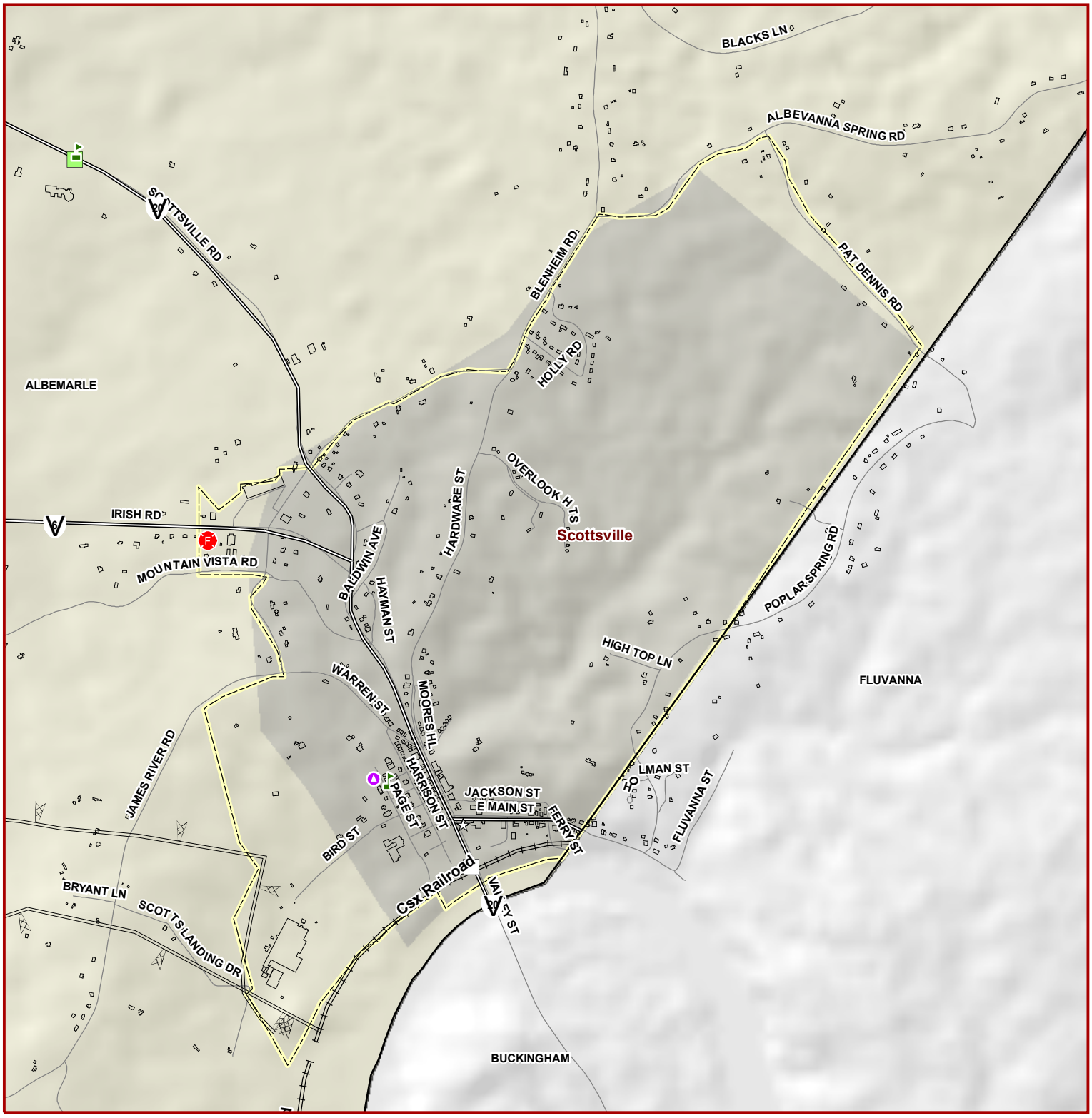
STF
EMT
WTF
Police
Hazmat
Fire Station
School/Daycare
Shelter
Pump Station
Emergency Services & Police
Subdivision Boundary
Targeted Development Area
Building Footprint

Town maps include neighborhoods, critical facilities, buildings, and major roads, all of which are vulnerable to high winds and winter storms.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
March 8, 2006 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Scottsville Vulnerability to Winds and Winter Storms



STF
EMT
WTF
Police
Hazmat
Fire Station
School/Daycare
Shelter
Pump Station
Emergency Services & Police
Subdivision Boundary
Targeted Development Area
Building Footprint

Town maps include neighborhoods, critical facilities, buildings, and major roads, all of which are vulnerable to high winds and winter storms.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
March 8, 2006 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Columbia Vulnerability to Winds and Winter Storms

STF
EMT
WTF
Police
Hazmat
Fire Station
School/Daycare
Shelter
Pump Station
Emergency Services & Police
Subdivision Boundary
Targeted Development Area
Building Footprint

Town maps include neighborhoods, critical facilities, buildings, and major roads, all of which are vulnerable to high winds and winter storms.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
March 7, 2006 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Mineral Vulnerability to Winds and Winter Storms

STF
EMT
WTF
Police
Hazmat
Fire Station
School/Daycare
Shelter
Pump Station
Emergency Services & Police
Subdivision Boundary
Targeted Development Area
Building Footprint

Town maps include neighborhoods, critical facilities, buildings, and major roads, all of which are vulnerable to high winds and winter storms.

Map is for general planning purposes only. The information contained on this map is not to be construed or used as a legal description.
February 15, 2006 C:\GIS\HMP\Albemarle\Albemarle Critical Facilities

Thomas Jefferson Planning District Commission

Tornadoes

Because it cannot be predicted where a tornado may touch down, all buildings and facilities are considered to be exposed to this hazard and could potentially be impacted. It is also not possible to estimate the number of residential, commercial, and other buildings or facilities that may experience losses.

The locations of past tornado events within the Planning District are shown on the map on page 75. Based upon historical data, the region will experience several tornadoes (1-7) in the next fifty years, causing 11 deaths and four to nine injuries. Property loss will likely total $250 to $700 million. As the population and number of building structures increase in the area, the number of deaths and injuries, as well as property damage, are likely to rise.

High Winds and Thunderstorms

The past is the best predictor of future damage from high winds and thunderstorms. There may be up to 100 high wind events in the Planning District over the next fifty years. These events will most likely cause injuries, but very few deaths. Property loss and crop damage may reach $20 million each. Most of the costliest wind events in the past have been associated with hurricanes.

Drought and Extreme Heat

Estimated potential losses due to drought are somewhat difficult to calculate because drought causes little damage to the built environment, mostly affecting crops and farmland. Based upon droughts over the past five years, the region will most likely be affected by several droughts over the next five to ten years, causing few deaths and injuries and little property loss. However, future droughts are expected to cause extensive damage ($50 - $100 million) to crops in the region.

Landslides

No summary data is available for damages from landslides. Of the two recorded in the planning district, both were associated with severe rain events. Cost estimates for landslide damage from Hurricane Camille are not separable from damage from other aspects of that storm, such as flooding. The recurrence period of landslides in a given location in the planning district is estimated to be 3,000-6,000 years. It is estimated that a landslide will occur somewhere along Virginia's Blue Ridge approximately every decade, but as that encompasses a large area, the chances of another occurring within the planning district within the next fifty years are relatively low.

Earthquake

HAZUS-MH estimates appear to be inaccurate due to the small magnitude of earthquakes most likely to occur in the region, but HAZUS-MH is the best available method of determining loss at this time. HAZUS-MH estimates that an earthquake occurring at the same epicenter as a December 9 earthquake in Columbia, Virginia (Fluvanna County) with a magnitude of 5.0 (the December 9 quake measured 4.5 but the minimum user input by HAZUS is 5.0) and at the same depth would create very minimal damage. 226 buildings would be slightly damaged, 56 moderately, and 5 extensively. The majority of buildings expected to be damaged are constructed with unreinforced masonry (126), manufactured housing (52), and wood (47). Critical facilities, transportation systems, and utility systems would all remain completely operational and sustain no structural losses. Two potable water leaks, one wastewater leak, and one natural gas leak were estimated to occur. No fire or debris are expected to be generated as a result of the quake, and only one injury seeking medical attention but not hospitalization is projected. Property loss is estimated at $3.19 million; 4% is related to the business interruption of the region. 88% of total loss is sustained by residential structures. Railways are estimated to sustain $1000 in loss, and airport facilities $2.1 million. Utility systems are expected to sustain $4.49 million in damages collectively. In comparison to the actual damage of the earthquake, HAZUS has greatly overestimated the possible damage. Only slight damage was reported near the earthquake in Fluvanna County at Bremo Bluff and Kents Store.

Earthquakes greater than a 5.0 magnitude do have a small chance of occurrence; however, many of the historical earthquakes noted in the area have recorded magnitudes of 3.2 – 5.8. Because earthquakes can occur anywhere within the region, it is impossible to project which areas are most vulnerable outside of HAZUS loss estimated methodology. All future buildings – including critical facilities – must adhere to the statewide building code, which may make these buildings less susceptible than some of the older building stock in the region.

Wildfire

As stated in the Hazard Identification and Risk Assessment, the TJPDC is subdivided by areas of high, medium, and low risk for wildfires according to the Virginia Department of Forestry. Woodland Home Communities are clusters of homes located along forested areas at the wildland-urban interface that could possibly be damaged during a nearby wildfire incident. Potential losses to these structures were estimated by determining the average price of houses classified as being part of a Woodland Home Community and projecting potential losses in each locality. Results are shown in the following tables. Approximately two billion dollars of residential property is at risk to wildfire. There are 6106 houses in these communities, which is about 10% of the total housing stock in the counties; Charlottesville, because it is urban in nature, is not included in this analysis. Also approximately 10% of the counties' residential population is at risk of wildfires.

Hazard: Wildfire

Inventory Assets: Albemarle

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	29687	2418	8.14%	$5,008,352,000	$407,928,690	8.14%	84186	5900	7.01%

Inventory Assets: Fluvanna

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	7824	2690	34.38%	n/a	$299,397,000	n/a	20047	6967	34.75%

Inventory Assets: Greene

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	5723	187	3.27%	$729,924,000	$20,831,800	2.85%	15244	507	3.32%

Inventory Assets: Louisa

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	11120	696	6.26%	$5,008,352,000	$1,386,118,000	27.68%	25627	1782	6.95%

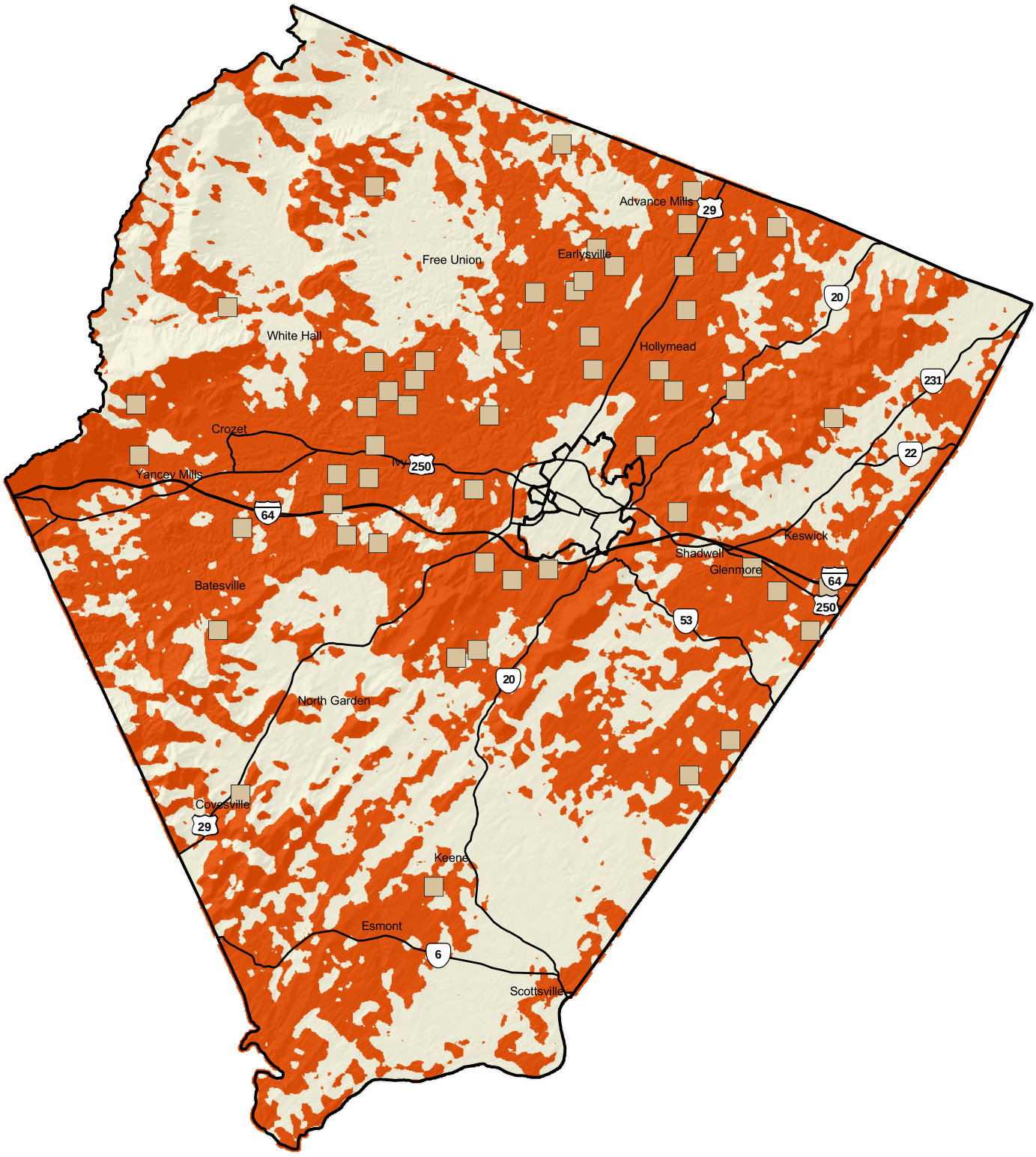
Inventory Assets: Nelson

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	7378	115	1.56%	$727,726,100	$11,051,500	1.52%	14445	278	1.93%

Inventory Assets: Total PDC

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Locality	# in Hazard Area	% in Hazard Area	$ in Locality	$ in Hazard Area	% in Hazard Area	# in Locality	# in Hazard Area	% in Hazard Area
Residential	61732	6106	9.89%	$11,474,354,100	$2,125,326,990	18.52%	159549	15434	9.67%

Albemarle Homes at High Risk to Wildfire



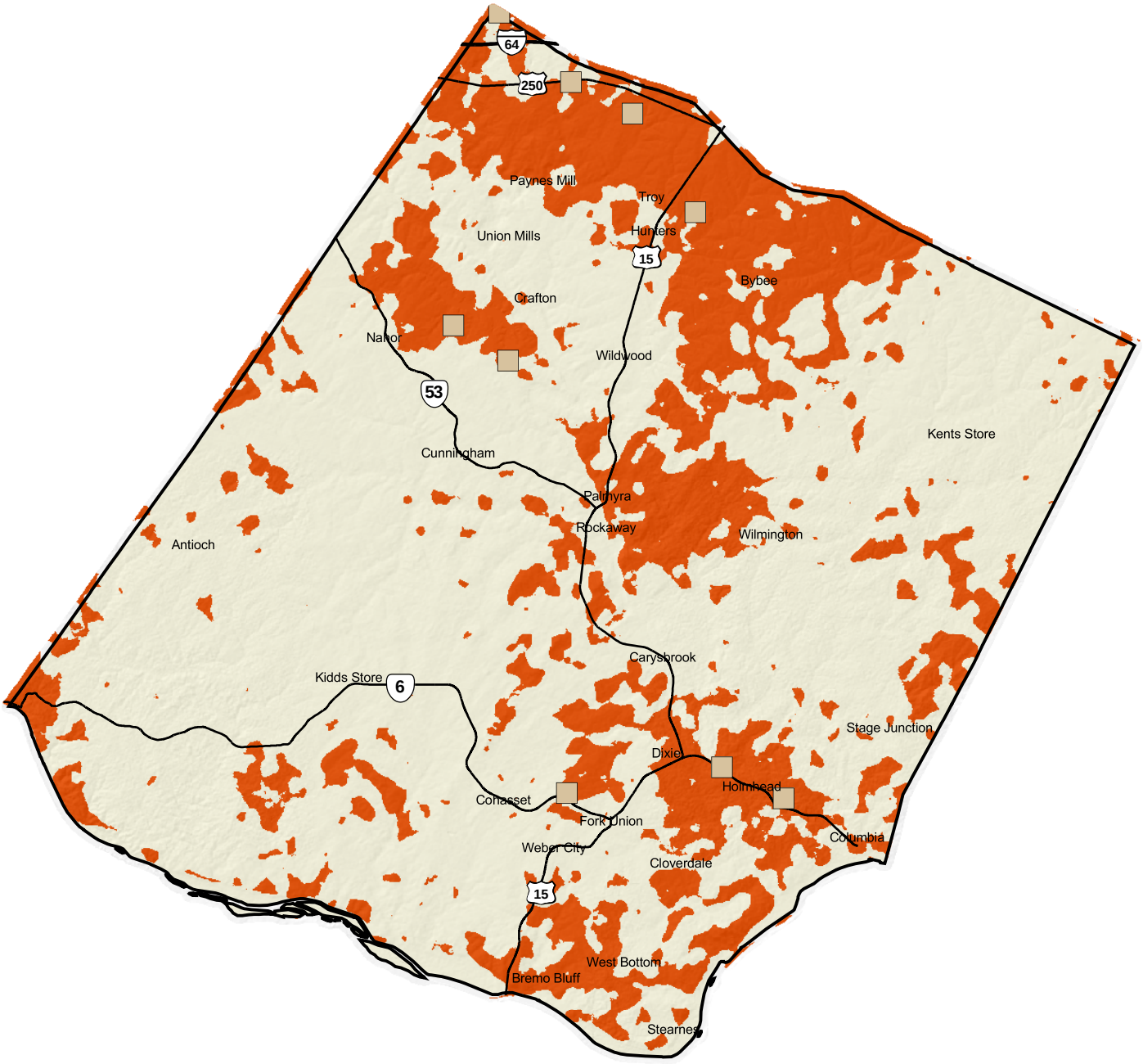
Woodland Home Community

High Wildfire Risk

At Risk Homes	Total Value
2418 Residential	$389,298,000

This map is for general planning purposes only. 01/21/05
C:\GIS\HMP\Albemarle\Albemarle Woodland Homes Fire Risk
Source: The Virginia Department of Forestry, July 2003, thomasjefferson

Fluvanna Homes at High Risk to Wildfire



Woodlalnd Home Community

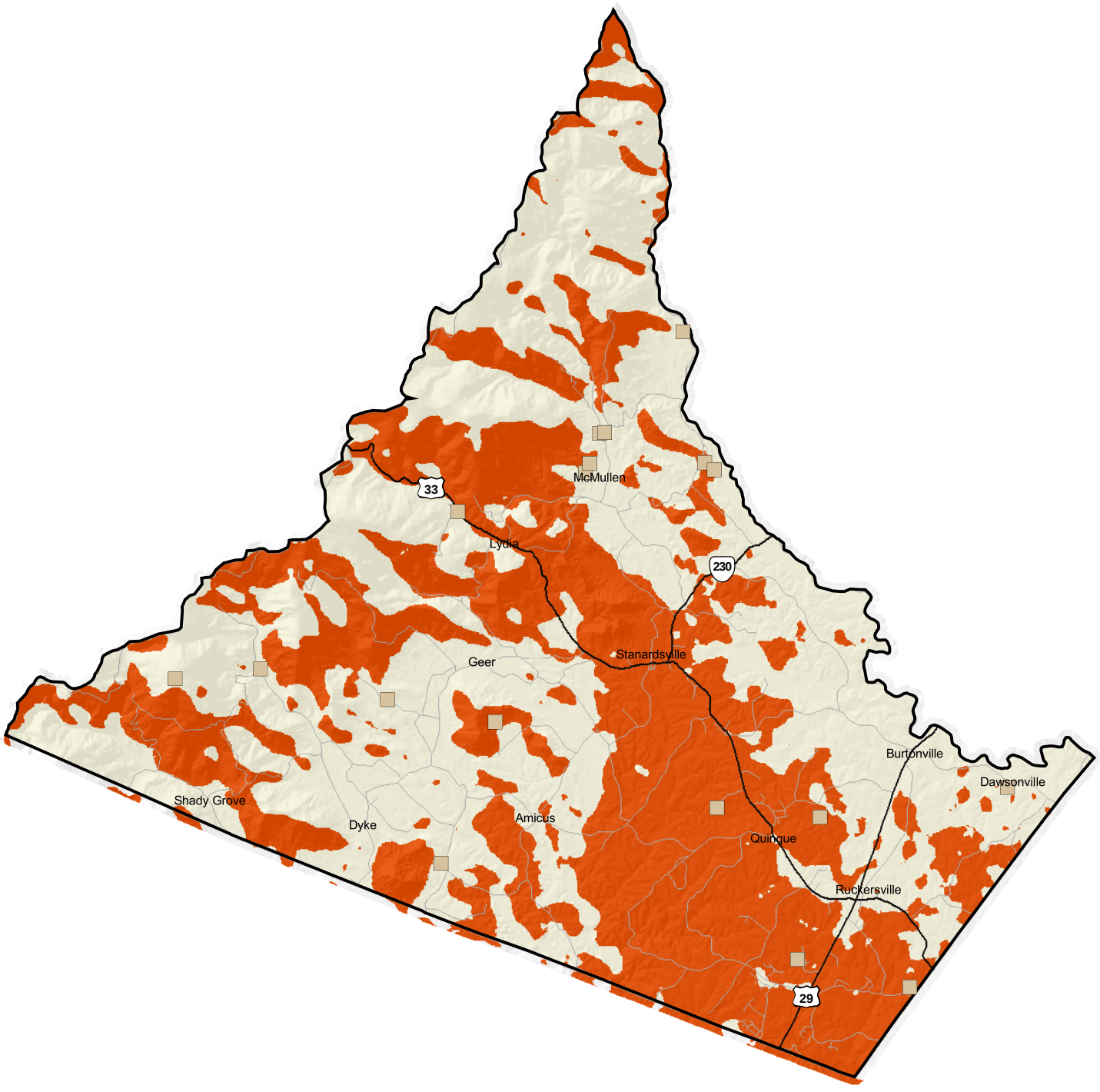
High Wildfire Risk

At Risk Homes	Total Value
2690 Homes	$299,397,000

This map is for general planning purposes only. 01/21/05
C:\GIS\HMP\Fluvanna\Fluvanna Woodland Homes Fire Risk
Source: The Virginia Department of Forestry, July 2003, thomasjefferson

Thomas Jefferson Planning District Commission

Greene Homes at High Risk to Wildfire



Woodland Home Community

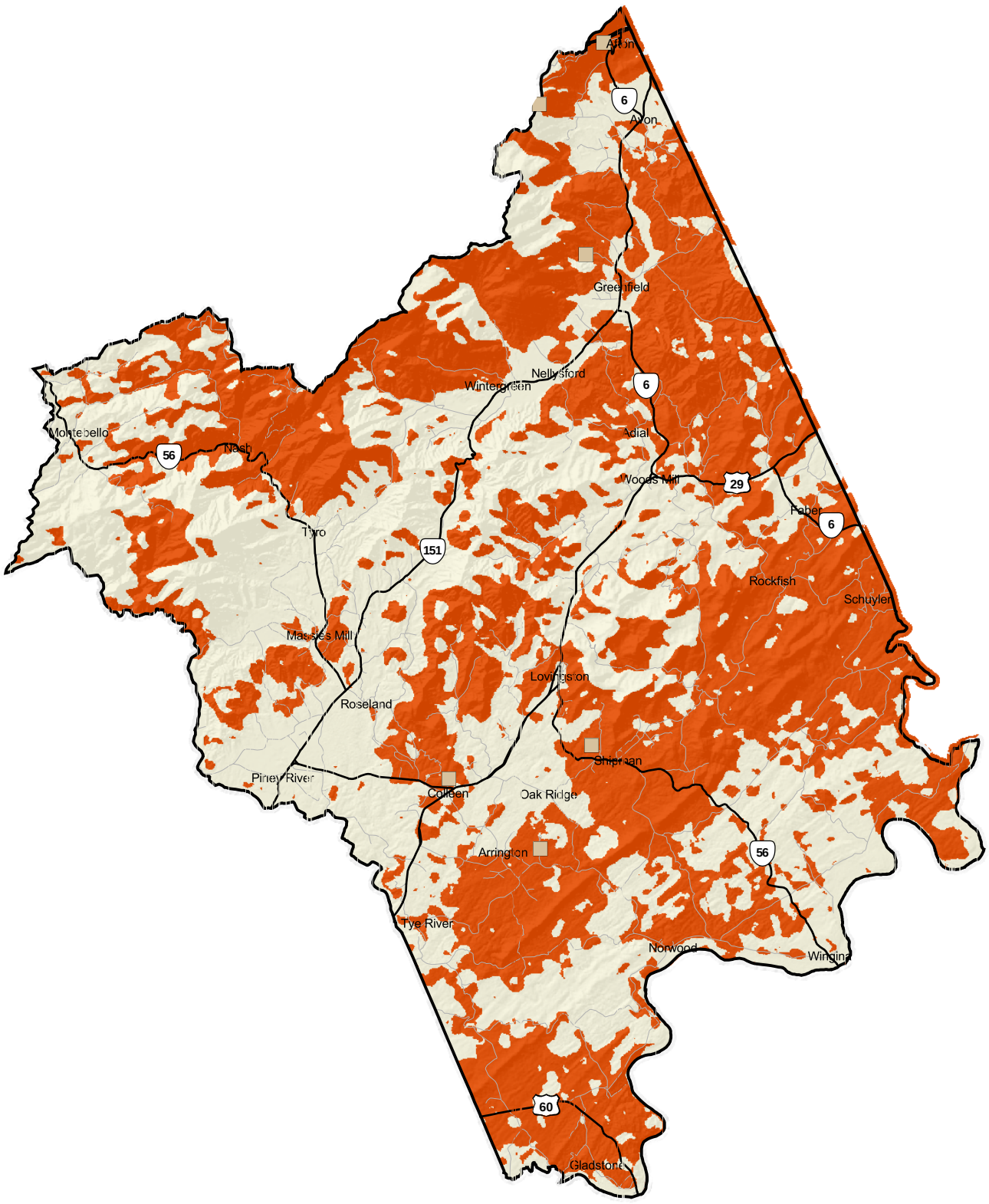
High Wildfire Risk

At Risk Homes	Total Value
187 Homes	$ 20,831,800

This map is for general planning purposes only. 01/25/05
C:\GIS\HMP\Greene\Greene Woodland Homes Fire Risk
Source: The Virginia Department of Forestry, July 2003, thomasjefferson

Thomas Jefferson
Planning District Commission

Nelson Homes at High Risk to Wildfire



Woodland Home Community

High Wildfire Risk

At Risk Homes	Total Value
115 Homes	$ 11,051,500

This map is for general planning purposes only. 01/25/05
C:\GIS\HMP\Nelson\Nelson Woodland Homes Fire Risk
Source: The Virginia Department of Forestry, July 2003, thomasjefferson

Thomas Jefferson Planning District Commission

Dam Failure

Nine dams in the TJPDC could cause loss of life if they were to fail. Of these nine, five have emergency action plans, the Upper Ragged Mountain dam does not have a plan, and the other three do not require them. Dams of significant risk to the area are not required to have emergency action plans; however, 12 dams do have these plans. According to the Virginia State Hazard Mitigation Plan, "hazard potential is not related to the structural integrity of a dam but strictly to the potential for adverse downstream effects if the dam were to fail. Frequency of dam inspection is dependent on how the dam is classified." Further information can be referenced in each localities' Emergency Operations Plan. At this time, no data are available as to how much life or property loss would be likely to occur in the event that any of these dams were to fail.

Capability Assessment

A capability assessment has two components: an inventory of agencies' missions, programs, and policies, and an analysis of their capacities to carry them out. A capability assessment is an integral part of the planning process in that it helps identify, review, and analyze current mitigation activities as well as the ability of each jurisdiction to implement future mitigation projects.

Conducting the Capability Assessment

Communities have the power to put basic tools in place to prevent unwanted situations that put people and property at risk of damage from future hazards. The comprehensive planning process provides a platform for determining how to develop a community without adding to risks. Zoning and development codes can be written to promote intelligent development and site designs that also allow proper emergency access. Localities can provide the proper staff and resources to review and inspect new construction and older structures for any potential problems before they become an emergency. This plan will recommend options for strengthening local capabilities to mitigate hazards. Localities lacking certain plans or policies may consider adopting them. Localities with plans and policies in place may wish to update them, drawing in language from neighboring localities as needed.

To help identify local capabilities which may need improvement, TJPDC staff created a simple table listing all of the types of plans, programs, and policies relevant to hazard mitigation planning. Three categories of capability are used for simplicity: Low, Moderate, and High.

TJPDC Hazard Mitigation Capability Assessment by Locality

	HMP	DRP	CP	FMP	SMP	EOP	COOP	REP	SARA	TRAN	CIP	REG	HPP	ZO	SO	FDPO	CRS	BC	ESCO	**SCORE**
Charlottesville	x		x	x		x				x	x	x	x	x	x			x	x	High
Albemarle County	x		x	x	x	x				x	x	x	x	x	x			x	x	High
Fluvanna County	x		x	x		x				x		x		x	x			x	x	High
Greene County			x	x						x		x		x	x			x	x	Moderate
Louisa County			x	x	x	x				x		x		x	x			x	x	High
Nelson County			x	x						x		x		x	x			x	x	Moderate
Town of Columbia			x	x								x		x						Low
Town of Mineral			x									x								Low
Town of Louisa			x									x								Low
Town of Scottsville			x		x							x			x				x	Moderate
Town of Stanardsville			x									x			x			x		Low

HMP – Hazard Mitigation Plan
DRP – Disaster Recovery Plan
CP – Comprehensive Plan
FMP – Floodplain Management Plan / Flood Mitigation Plan
SMP – Stormwater Management Plan
EOP – Emergency Operations Plan
COOP – Continuity of Operations Plan
REP – Radiological Emergency Plan
SARA – SARA Title III Emergency Response Plan

CIP – Capital Improvements Plan (that regulates infrastructure in hazard areas)
REG – Regional Planning
HPP – Historic Preservation Plan
ZO – Zoning Ordinance
SO – Subdivision Ordinance
FDPO – Flood Damage Prevention Ordinance
CRS – Community Rating System
BC – Building Codes
ESCO – Erosion and Sediment Control Ordinance

An assessment serving to quantify the capabilities of each jurisdiction within the region follows. This assessment was based on the above information and the results of a questionnaire submitted to the planners and emergency managers in each locality. The range for points is: 0-14= limited overall capability, 15-29= moderate overall capability, and 30-46= high overall capability. This information aided each locality in determining the priorities of mitigation actions.

Capability Assessment Ranking System						
Yes = 3 No = 0	Charlottesville	Albemarle	Fluvanna	Greene	Louisa	Nelson
HMP	3	3	3	0	0	0
Radiological Emergency Plan	0	0	0	0	0	0
SARA Title III/Hazardous Mat'l ERP	0	0	0	0	0	0
CRS Community	0	0	0	0	0	0
BCEGS Grade of 1-5	0	0	0	0	0	0
TOTAL:	3	3	3	0	0	0
Yes = 3 No = 0						
EOP	2	2	2	0	2	0
Comp Plan addressing hazards	0	0	0	0	0	0
DRC	0	0	0	0	0	0
COP	0	0	0	0	0	0
Regional Planning	2	2	2	2	2	2
Stormwater Mgt Plan	2	2	0	0	2	0
NFIP Community	2	2	2	2	2	2
Floodplain Mgt Plan	2	2	2	2	2	2
BCEGS Grade 6-9	0	0	0	0	0	0
TOTAL:	10	10	8	6	10	6
Yes = 1 No = 0						
Comp Plan (no natural hazards addressed)	1	1	1	1	1	1
Transportation Plan	1	1	1	1	1	1
Capital Improvement Plan	1	1	0	0	0	0
Historic Preservation Plan	1	1	0	0	0	0
Zoning Ordinance	1	1	1	1	1	1
Subdivision Ordinance	1	1	1	1	1	1
Adopted Building Code	1	1	1	1	1	1
TOTAL:	7	7	5	5	5	5
High=2, Mod=1, Low=0						
Technical Capability	1	1	1	0	1	0
Fiscal Capability	1	1	1	0	0	0
Administrative Capability	1	1	2	0	1	1
Political Capability	2	2	2	2	NA	1
TOTAL:	5	5	6	2	2	2
TOTAL:	25	25	22	13	17	13

Mitigation Action Plan

201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Introduction

The purpose of the Mitigation Action Plan is to provide the tools necessary to reduce the impact of natural hazards in the Thomas Jefferson Planning District. In order to guide the actions of those charged with implementation, the Plan follows a traditional planning approach, beginning with a mission statement that provides the overall guiding principle. Goals are intended to meet the intent of the mission statement. Next, mitigation actions serve to provide clear, measurable tasks, which may include policies or projects designed to reduce the impacts of future hazard events.

Mission Statement: To protect local residents, property, businesses, and the natural environment from damage by implementing long-term goals to reduce the impacts of natural hazards.

Goals: While the goals of this hazard mitigation plan are concurrent with the goals of FEMA and the Virginia Department of Emergency Management in reducing loss of life and property, the TJPDC also wishes to recognize the importance of enhancing sustainability. For this reason, the 1998 Sustainability Accords were consulted in writing the goals for this Plan. The Sustainability Accords are a product of the Thomas Jefferson Sustainability Council, formed in 1994, which included representatives from all of the localities. Completed in 1998, the Accords collectively serve as a community agenda and individually "provide an opportunity for individual and community action toward sustainability for the region." Taking the Sustainability Accords into consideration will help ensure that future development will occur in a way that does

not place people intentionally in the way of natural hazards and protects portions of the environment that can serve as a buffer to such hazards. Retaining farmland and forestland will help to keep levels of impervious surfaces low in the region, which will be beneficial in terms of runoff that can cause flash floods and urban flooding. Education about sustainability can be paired with education about hazards and mitigation to allow citizens to see the impact that hazard destruction can have on a sustainable region. Interruption of services can force heavy costs upon a region, and by mitigating hazards before they occur, we can reduce the economic losses that occur to our locality.

Education and Outreach

GOAL: Through education and training, increase awareness of hazards and potential mitigation strategies.

OBJECTIVE: Educate citizens on techniques for disaster preparedness.

OBJECTIVE: Educate and train key agency staff on disaster mitigation and preparedness, with an emphasis on emergency respondents, building inspectors and code officials.

OBJECTIVE: Develop hazard mitigation educational materials and a process for disseminating information to citizens, local and regional staff and agencies.

OBJECTIVE: Identify outreach methods to reach a large percentage of the population.

Information and Data Development

GOAL: Build capacity with information and data development to refine hazard identification and assessment, mitigation targeting and funding identification.

OBJECTIVE: Identify data and information needs and develop methods to meet these needs.

OBJECTIVE: Ensure that critical facilities meet disaster preparedness requirements.

OBJECTIVE: Plan for long-term needs to adequately address future conditions that may exacerbate identified hazards.

Policy, Planning, and Funding

GOAL: Incorporate Sustainability Accords and mitigation concepts into existing and future policies and plans.

OBJECTIVE: Incorporate mitigation planning concepts into zoning, ordinances and building codes.

OBJECTIVE: Establish or revise policies to ensure that critical facilities and emergency shelters are operational during and after natural disasters.

OBJECTIVE: Link community planning and mitigation planning together to achieve common community goals.

GOAL: Pursue funding to implement identified mitigation strategies.

OBJECTIVE: Identify appropriate funding sources.

OBJECTIVE: Create or strengthen partnerships to develop integrated grant proposals and coordinated implementation plans.

OBJECTIVE: Increase staffing to implement mitigation strategies.

Structural Mitigation Projects

GOAL: Identify and implement physical projects that will directly reduce impacts from hazards.

OBJECTIVE: Elevate, retrofit and relocate existing structures and facilities in vulnerable locations.

OBJECTIVE: Install devices and signage to improve communication and warning systems, ensure operations of emergency shelters, and reduce response time in the event of a natural hazard.

OBJECTIVE: Provide buffers in sensitive areas to protect lives and property.

Methodology:

In formulating the Thomas Jefferson Planning District Mitigation Action Plan, a wide range of activities were considered in order to achieve the goals of participating jurisdictions. All actions chosen fell into one of the four broad categories listed below:

1. Information and Data Development
2. Outreach and Education
3. Structural
4. Policy, Planning, and Funding

Process:

The Thomas Jefferson Planning District Commission employed a variety of methods to compile an exhaustive list of mitigation options, which was distributed to each locality for further consideration. First, mitigation strategies were compiled from the results of the web survey, ideas generated from meetings and staff, and other plans. Sample mitigation strategies were presented at the December 8, 2004 Advisory Committee meeting (see notes in Appendix). Then, a short list of examples was presented at each locality's Local Emergency Planning Committee and brainstorming sessions were held following each presentation (notes included in Appendix). Finally, a list was compiled of all potential mitigation strategies, which was then distributed to the Working Group (emergency managers, county administrators and planners from each locality). The Working Group was asked to identify mitigation strategies for their localities to be included in the plan. The TJPDC then prepared cost estimates, agency, and funding information for each action. TJPDC staff worked with each locality to determine the priority (high, moderate, or low) of each potential mitigation action. Actions were prioritized by taking into account the magnitude of risk and the severity of the hazard being mitigated, the capabilities of each locality to complete the mitigation action, the cost of the mitigation project, and the timeframe in which the mitigation projects would be likely to be carried out (actions which may

not be started by the plan update would be more likely to receive a priority ranking of low). Although a formal cost-benefit analysis was not carried out in the prioritization process, both cost and benefit weighed heavily in the ranking. Before seeking funding, a more formal analysis, such as that used in FEMA's benefit-cost analysis modules, would be employed.

The Mitigation Action Worksheet template follows:

Mitigation Action	
Community Name:	
Category:	
Action Item (Describe):	
Hazard (s):	The hazard(s) the action attempts to mitigate.
Lead Agency/Department Responsible:	Identify the local agency, department, or organization that is best suited to accomplish the action.
Estimated Cost:	If applicable, indicate the cost to accomplish the mitigation action. This amount should be estimated until a final dollar amount can be determined.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	If applicable, indicate how the cost to complete the action will be funded.
Implementation Schedule:	Indicate when the action will begin, and when the action is expected to be completed.
Priority	Indicate whether the action is high-priority, moderate-priority, or low-priority based on yet to be determined characteristics.

A summary table of the mitigation strategy follows. Mitigation actions are numbered XYZ#, where X denotes locality (Regional, Albemarle, Albemarle – Town of Scottsville, Charlottesville, Fluvanna, Fluvanna – Town of Columbia, Louisa, Louisa – Town of Louisa, Louisa – Town of Mineral, Greene, Greene – Town of Stanardsville, and Nelson), Y denotes priority (Low, Moderate, High) and Z denotes type of mitigation action (Structural; Education and Outreach; Policy, Planning and Funding; Information and Data Development), with projects numbered sequentially within categories.

Regional Project List		
Number	Action	Implementation Schedule
RHP1	Write Regional Green Infrastructure Plan	1-2 years
RHI1	Create an Interactive Map Server and Database	1-2 years
RHE1	Create a hazards library and information toolkit	1-3 years
RHP2	Complete the Regional Water Supply Plan	1-2 years
AHE1	Provide a telephone number or website that gives useful information following a disaster	1-2 years
AHE2	Place hazard mitigation plan in local libraries and on locality websites	Upon plan approval
AHE3	Create educational campaign about the benefits of open space protection	Ongoing
AHE4	Provide educational information about the burn permit process	Ongoing
AHE 5	Add emergency preparedness and response information in local phone books	1-2 years
AHI1	Conduct study of resistance of critical facilities to natural hazards	1-3 years
AHI2	Complete water supply study	1 year
AHI3	Coordinate with Fluvanna County on emergency plan for failure of South Fork Rivanna Reservoir Dam	1 year
AHP1	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
AHP2	Incorporate hazard mitigation plan into community plans	1-2 years
AHP3	Conduct Community Emergency Response Team (CERT) classes	Ongoing
AHP4	Increase number of trained emergency responders	As increased population warrants
AHP5	Support tree maintenance program	Ongoing
AHP6	Implement recommendations of water supply study	50 years
AHS1	Ensure that all shelters and public buildings have a battery-powered emergency radio and flashlight	1 year
AHS2	Conduct phase I improvement to Ragged Mountain Reservoir Dam--Add larger spillway and additional concrete reinforcement to spillway	1-5 years
AHS3	Conduct structural evaluations of all current and proposed shelters	1-3 years
AME1	Encourage water conservation	Ongoing
AME2	Create a public education program on disaster preparedness	Ongoing
AME3	Create displays about mitigation actions for use at public events	2-5 years
AME4	Conduct FireWise workshops	2-5 years
AME5	Encourage property owners to clear out dead wood from forests	Ongoing
AMI1	Gather and maintain GIS database on bank restoration needs of Rivanna Reservoir	Ongoing
AMI2	Expand GIS data for use in mitigation planning activities	Ongoing
AMP1	Create Emergency Action Plan for Upper Ragged Mountain Dam	1-3 years
AMP2	Continue to pursue conservation easements in sensitive areas	Ongoing
AMP3	Develop cooperative agreement between all agencies involved in emergency management, provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster, and conduct joint emergency exercises	2-5 years
AMP4	Hire fire code official	2-5 years

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
AMS1	Install backup generators in shelters and critical facilities	As new shelters and critical facilities are built
AMS2	Build or repair bridges so as to not impede floodwaters	When new bridges are built or repaired
AMS3	Upgrade all area bridges to support emergency vehicles	As repairs are made
AMS4	Complete phase II improvements to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline	3-5 years
AMS5	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations	3-5 years
ALE1	Encourage residents and agencies to clear storm drain inlets, ditches, and channels	Ongoing
ALE2	Establish a "Hazard Awareness Week" with local media to educate public about natural hazards	3-5 years
ALE3	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	3-5 years
ALP1	Use recreational trails as fire breaks and access lines	Ongoing
ALP2	Acquire riparian easements in sensitive and/or floodprone areas	3+ years
ALS1	Improve the maintenance of stormwater conveyance systems.	Ongoing
ALS2	Increase capacity of drainage systems and ponds where needed	5+ years
ALS3	Clear creek beds or dredge creeks to remove debris where flooding has increased	5+ years
ALS4	Reduce pollution discharge via stormwater systems	Ongoing
ALS5	Retrofit stormwater management basins	Ongoing
ALS6	Ensure evacuation routes meet proper standards	5+ years
ALS7	Encourage fire breaks in tree farms	Ongoing
ALS8	Install more dry hydrants in high wildfire risk areas	3-5 years
ALS9	Clear ditches of flammable debris	Ongoing
ALS10	Create defensible spaces between Woodland Home Communities and areas of high wildfire risk	5+ years
ALS11	Move shrubs and landscaping away from homes, public buildings, and businesses, and clear dead brush and grass from properties in high wildfire risk areas	Ongoing
ALS12	Maintain and add more fire rings in camping areas for controlled fires	5+ years
ASMP1	Incorporate hazard mitigation plan into community plans	1-5 years
ASLS1	Bury utilities underground in town of Scottsville	1-5 years
CHE1	Provide a telephone number or website that gives useful information following a disaster	1-2 years
CHE2	Place hazard mitigation plan in local libraries and on City website	Upon plan approval
CHE3	Create educational campaign about the benefits of open space and sensitive area protection	Ongoing
CHE 4	Add emergency preparedness and response information in local phone books	1-2 years
CHI1	Complete water supply study	1 year
CHP1	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
CHP2	Incorporate hazard mitigation plan into community plans	1-2 years
CHP3	Conduct Community Emergency Response Team (CERT) classes	Ongoing
CHP5	Implement recommendations of water supply study	50 years
CHP6	Provide rebate to homeowners who purchase low-flow appliances	Ongoing

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Regional Project List		
Number	Action	Implementation Schedule
CHP7	Encourage more institutions to use low-flow appliances	Ongoing
CHP8	Continue use of the Reverse E911 System	Ongoing
CHP9	Ensure all large facilities have updated evacuation plans	1-3 years
CHP10	Ensure all large facilities have updated shelter in place plans	1-3 years
CHS1	Ensure that all shelters and public buildings have a battery-powered emergency radio and flashlight	1 year
CHS2	Conduct phase I improvement to Ragged Mountain Reservoir Dam--Add larger spillway and additional concrete reinforcement to spillway	1-5 years
CME1	Encourage water conservation	Ongoing
CME2	Create a public education program on disaster preparedness	Ongoing
CME3	Create displays about mitigation actions for use at public events	2-5 years
CMI1	Gather and maintain GIS database on bank restoration needs of Rivanna Reservoir	Ongoing
CMP1	Create Emergency Action Plan for Upper Ragged Mountain Dam	1-3 years
CMP2	Pursue conservation easements in sensitive areas	Ongoing
CMP3	Develop cooperative agreement between all agencies involved in emergency management and provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster and conduct joint emergency exercises	2-5 years
CMP4	Support volunteer groups and encourage collaboration on public outreach and education programs on hazard mitigation	Ongoing
CMP5	Establish plan for muncipal operations prior to and during drought	1-5 years
CMP6	Require more stringent policy to discourage floodplain development	2-4 years
CMP7	Prevent clear cutting or removal of forested areas to prevent mudslides	Ongoing
CMP8	Support purchase of rain barrels	Ongoing
CMP9	Develop water restriction policy during drought	3-5 years
CMP10	Encourage policy which implements proactive environmental actions to reduce flooding--reduce impervious surfaces, restore wetlands, restore streambanks, add curb extensions to catch leaf debris, etc.	Ongoing
CMP11	Create a media strategy	Ongoing
CMS1	Build or repair bridges so as to not impede floodwaters	When new bridges are built or repaired
CMS2	Upgrade all area bridges to support emergency vehicles	As repairs are made
CMS3	Complete phase II improvements to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline	3-5 years
CMS4	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations	3-5 years
CMS5	Put high water marks on bridges	2-5 years
CMS6	Add signage to roads in locations that frequently flood	2-5 years
CMS7	Retrofit emergency services buildings for hazard resistance	3-5 years
CLE3	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	3-5 years
CLI4	Conduct channel improvement study to investigate flooding problems	3-5 years
CLP2	Join the Community Rating System	3-5 years
CLP3	Support open space preservation in floodplains	Ongoing

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action

Regional Project List		
Number	Action	Implementation Schedule
CLP4	Hire a floodplain management official and enforce floodplain regulations	3-5 years
CLP5	Encourage homeowners to install back-flow valves to prevent reverse flow	Ongoing
CLP6	Encourage creek and stream storage capacity through daylighting	5+ years
CLP7	Preserve riparian buffers	Ongoing
CLS1	Improve the maintenance of stormwater conveyance systems.	Ongoing
CLS2	Increase capacity of drainage systems and ponds where needed	5+ years
CLS3	Clear creek beds or dredge creeks to remove debris where flooding has increased	5+ years
CLS4	Reduce pollution discharge via stormwater systems	Ongoing
CLS5	Retrofit stormwater management basins	Ongoing
CLS6	Ensure evacuation routes meet proper standards	5+ years
CLS7	Remove abandoned buildings in floodplains	5+ years
CLS8	Bury power, phone, and cable utility lines underground	5+ years
CLS9	Provide citizens with literature about flood and drought-smart landscaping	3-5 years
FHE1	Provide telephone number and website with useful information before and during a disaster	1-3 years
FHI1	Update National Flood Insurance Maps	1-3 years
FHP1	Conduct structural evaluations and study of resistance to hazards of all current and proposed shelters	1-5 years
FHS1	Retrofit emergency services building for hazard resistance	1-5 years
FHS2	Install backup generators in shelters and critical facilities	1-5 years
FMP1	Create a community toolbox with tools and information for local homeowners	3-5 years
FMP2	Develop water restriction policy during drought	Ongoing
FMP3	Incorporate hazard mitigation plans into community plans	1-3 years
FLE 1	Provide educational lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations	5+ years
FLE 2	Develop an all-hazard resource center at libraries or other public office	3-5 years
FLL2	Encourage protective stormwater mitigation measures such as flood project, reducing impervious surfaces, stilling and infiltration basins, and restoring wetlands in growth areas	5+ years
FLP1	Increase number of trained emergency responders and conduct CERT workshops	Ongoing
FCHE1	Provide telephone number and website with useful information before and during a disaster	1-3 years
FCMP1	Incorporate hazard mitigation plans into community plans	1-5 years
GHE1	Support volunteer groups and encourage collaboration on public outreach and education	Ongoing
GHE2	Provide training for building officials and code inspectors	1 year
GHE3	Place hazard mitigation plan in local libraries and websites	Upon plan adoption and approval
GHI1	Update FEMA Floodplain maps	1-5 years
GHI2	Conduct structural evaluations of current and proposed shelters	1-3 years
GHP1	Establish Reverse E-911 System	1 year
GHP2	Ensure all critical facilities have updated shelter-in-place plans	1-3 years

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Regional Project List		
Number	Action	Implementation Schedule
GHP3	Update driveway codes to allow access for emergency vehicles	1-3 years
GHP4	Routinely inspect fire hydrants	Ongoing
GHS1	Install backup generators in shelters and critical facilities	1-3 years
GME1	Develop all-hazard resource center	2-5 years
GME2	Develop cooperative agreement between all agencies involved in emergency management, provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster, and conduct joint	Ongoing
GMI1	Standardize GIS data for use in mitigation planning	2-5 years
GMI2	Conduct channel improvement study	3-5 years
GMI3	Create needs survey identifying special populations	1-3 years
GMP1	Support open space preservation in floodplain	Ongoing
GMP2	Ensure evacuation routes are upgraded to proper standards	2-5 years
GMP3	Incorporate hazard mitigation plan into community plans	In next comprehensive plan update
GMP4	Preserve riparian buffers	Ongoing
GMP5	Join the Community Rating System	2-5 years
GMP6	Conduct Citizen Emergency Respose Team (CERT) classes	1-3 years
GMP7	Require more stringent policy to discourage floodplain development	In next comprehensive plan, zoning code, and subdivision code update
GMS1	Retrofit emergency services building for hazard resistance	2-5 years
GMS2	Build and repair bridges so as not to impede floodwaters	2-5 years
GLE1	Encourage residents and agencies to clear storm drain inlets, ditches, and channels	Ongoing
GLP1	Investigate safety and maintenance of roads in private communities	3-5 years
GLP2	Ensure primary roads are clear of trees and power lines to the edge of the right of way	5+ years
GLP3	Provide paid fire and rescue staff	3-5 years
GLS1	Increase storage capacity of creeks and streams	5+ years
GLS2	Ensure culverts, streams, channels, storm drains, and gutters remain clear of debris	Ongoing
GLS3	Increase cell phone coverage in rural areas	1-3 years
GLS4	Create defensible space between Woodland Home Communities and areas of high wildfire risk	5+ years
GSHP1	Establish Reverse E-911 System	1 year
GSMP2	Incorporate hazard mitigation plan into community plans	1-5 years
GSLS1	Bury utilities in Town of Stanardsville and surrounding area	5+ years
LHE1	Encourage water conservation	Ongoing
LHE2	Provide a telephone number or website with useful information	1 year
LHE3	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building	1-3 years
LHE4	Place hazard mitigation plan in local libraries and on locality websites	Upon plan approval

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Regional Project List		
Number	Action	Implementation Schedule
LHP1	Establish Reverse E911 System in all localities	1-3 years
LHP2	Ensure that all large facilities have updated evacuation plans	1 year
LHP3	Ensure all large facilities have updated shelter in place plans	1 year
LHP4	Conduct Community Emergency Response Team (CERT) classes	Ongoing
LHP5	Increase number of trained emergency responders	Ongoing
LHS1	Install backup generators in shelters and critical facilities	Ongoing
LHS2	Put high water marks on bridges	1-2 years
LHS3	Ensure all shelters and public buildings have a battery-powered emergency radio & flashlight	1-2 years
LHS4	Ensure all houses have properly placed E911 address signs	1-2 years
LMS1	Install more dry hydrants	3-5 years
LME1	Create a public education program on how to be self-sufficient following a disaster and on mobilization	2-5 years
LMI1	Identify long-term water needs and investigate potential of increased water supply	1-3 years
LMI2	Support open space preservation in floodplains	Ongoing
LMP1	Create a needs survey that identifies special need homes or facilities needing attention in case of emergencies or evacuations	3-5 years
LMP2	Update National FEMA Floodplain Maps	1-3 Years
LMP3	Incorporate hazard mitigation plans into community plans	1-3 years
LMP4	Incorporate special needs populations into Hazard Mitigation and Emergency Operations Plans	2-5 years
LMP5	Provide more education about the burn permit process	2-5 years
LMS1	Add signage to roads in locations that frequently flood	2-4 years
LMS2	Increase cell phone coverage in rural areas	2-5 years
LLS1	Create defensible space between Woodland Home Communities and areas of high wildfire risk	5+ years
LLI1	Provide stilling and infiltration basins to capture stormwater and return it to the groundwater system	5+ years
LLP1	Track and map space available for pets at local SPCA and other animal shelters	1-5 years
LLP2	Develop driveway codes to allow emergency vehicle access	1-5 years
LLP3	Investigate safety and maintenance of roads in private communities	5+ years
LLP4	Adopt state fire codes and hire fire code officer	5+ years
LLP5	Develop more strict building and landscaping codes to prevent forest fires	5+ years
LLP6	Reduce pollution discharge via stormwater systems	5+ years
LLMP1	Incorporate hazard mitigation plans into community plans	1-5 years
LLLS1	Bury utilities underground in town of Louisa	1-5 years
LMMP1	Incorporate hazard mitigation plans into community plans	1-5 years
LMLS1	Bury utilities underground in town of Mineral	1-5 years
NHE1	Provide educational instruction and materials to school age youth and their teachers on proper procedures for responding to natural disasters	1 year

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Regional Project List		
Number	Action	Implementation Schedule
NHP1	Encourage residents to build and maintain private driveways adequate for emergency vehicles	Ongoing
NHP2	Complete installation of Reverse E-911 System	1-2 years
NHS1	Upgrade communication system	When funding is secured
NHS2	Install generators at all emergency shelters	1-3 years
NHS3	Ensure that all houses have properly placed, current 911 street addresses	1-3 years
NHS4	Install drone sirens at each fire and rescue station	1-5 years
NME1	Conduct Firewise Workshops	1-5 years
NMI1	Update FEMA floodplain maps	2-5 years
NMS1	Investigate potential to elevate or otherwise protect roads from flooding: Rt. 617, 29 at Nelson County High School, Knuckle Run, Colleen by Woodland Church, Rt. 56 at Tye River, Rt. 632 at Rockfish River, Johnson Hollow	2-5 years
NMS2	Create defensible spaces between Woodland Home Communities and areas of high wildfire risk	3-5 years
NLP1	Strengthen policy to prohibit development in or near floodplains	3-5 years
NLP2	Join the Community Rating System	5+ years
NLP3	Strengthen building codes to protect homes from wildfires	3-5 years
NLP4	Develop cooperative agreement with surrounding jurisdictions and institutions of higher education to improve communiciations	2-3 years

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is to provide easy reference to the mitigation action

R	Regional
A	Albemarle
AS	Albemarle - Town of Scottsville
C	Charlottesville
F	Fluvanna
FC	Fluvanna - Town of Columbia
G	Greene
GS	Greene - Town of Stanardsville
L	Louisa
LL	Louisa - Town of Louisa
LM	Louisa - Town of Mineral
N	Nelson

Priority

H	High
M	Moderate
L	Low

Mitigation Action Type

E	Education and Outreach
I	Information and Data Development
P	Planning, Policy, and Funding
S	Structural

Regional Project List		
Number	Action	Implementation Schedule
NHP2	Complete installation of Reverse E-911 System	1-2 years
NHS1	Upgrade communication system	When funding is secured
NHS2	Install generators at all emergency shelters	1-3 years
NHS3	Ensure that all houses have properly placed, current 911 street addresses	1-3 years
NHS4	Install drone sirens at each fire and rescue station	1-5 years
NME1	Conduct Firewise Workshops	1-5 years
NMI1	Update FEMA floodplain maps	2-5 years
NMS1	Investigate potential to elevate or otherwise protect roads from flooding: Rt. 617, 29 at Nelson County High School, Knuckle Run, Colleen by Woodland Church, Rt. 56 at Tye River, Rt. 632 at Rockfish River, Johnson Hollow	2-5 years
NMS2	Create defensible spaces between Woodland Home Communities and areas of high wildfire risk	3-5 years
NLP1	Strengthen policy to prohibit development in or near floodplains	3-5 years
NLP2	Join the Community Rating System	5+ years
NLP3	Strengthen building codes to protect homes from wildfires	3-5 years
NLP4	Develop cooperative agreement with surrounding jurisdictions and institutions of higher education to improve communiciations	2-3 years

*XYZ#, where X denotes locality, Y denotes priority, and Z denotes type of mitigation action
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R	Regional
A	Albemarle
AS	Albemarle - Town of Scottsville
C	Charlottesville
F	Fluvanna
FC	Fluvanna - Town of Columbia
G	Greene
GS	Greene - Town of Stanardsville
L	Louisa
LL	Louisa - Town of Louisa
LM	Louisa - Town of Mineral
N	Nelson

Priority

H	High
M	Moderate
L	Low

Mitigation Action Type

E	Education and Outreach
I	Information and Data Development
P	Planning, Policy, and Funding
S	Structural

Regional Mitigation Projects Mitigation Action #RHP1	
Community Name:	Regional Mitigation Project
Category:	Planning, Policy and Funding
Action Item (Describe):	Write Regional Green Infrastructure Plan
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	$50,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Department of Forestry Urban and Community Forestry Assistance, Virginia Department of Conservation and Recreation
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #RHI1	
Community Name:	Regional Mitigation Project
Category:	Information and Data Development
Action Item (Describe):	Create an Interactive Map Server and Database
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	$27,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Department of Forestry Grant, Funding from Canaan Valley Institute, ESRI NDSI Cooperative Grant
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #RHE1	
Community Name:	Regional Mitigation Project
Category:	Education and Outreach
Action Item (Describe):	Create a hazards library and information toolkit
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	$25,000-30,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FEMA Hazard Mitigation Grant Program, Pre Disaster Mitigation Grant
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #RHP2	
Community Name:	Regional Mitigation Project
Category:	Policy, Planning, and Funding
Action Item (Describe):	Complete the Regional Water Supply Plan
Hazard (s):	Drought
Lead Agency/Department Responsible:	Rivanna Water and Sewer Authority, TJPDC
Estimated Cost:	$100,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation, General Revenue, River Basin Program (Natural Resources Conservation Service), Virginia Department of Environmental Quality
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action # AME1	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Encourage water conservation.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development- Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # ALE1	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Encourage residents and agencies to clear storm drain inlets, ditches, and channels.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development= Water Resources/County Executive's Office – Community Relations
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # AME2	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Create a public education program on disaster preparedness.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, TJPDC, County Executive's Office – Community Relations
Estimated Cost:	$2,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, FEMA Community Assistance Performance Grants (SSE), Emergency Management Performance Grants
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # AHE1	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Provide a telephone number or website that gives useful information following a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator; County Executive's Office – Community Relations
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation, General Revenue
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action # ALE2	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Establish a "Hazard Awareness Week" with local media to educate public about natural hazards.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation, FEMA Community Assistance Performance Grants (SSE), Emergency Management Performance Grants
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action # AHP1	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action # ALE3	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC, Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action # AHE2	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Place hazard mitigation plan in local libraries and on locality websites.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	Staff time and resources.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Upon full approval and adoption of plan
Priority	High

Mitigation Action # AME1	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Create displays about mitigation actions for use at public events.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, County Executive's Office – Community Relations
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action # AMP1	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Create an Emergency Action Plan for the Upper Ragged Mountain Dam
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$20,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept. of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept. of Agriculture, National Resources Conservation Services)
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action # AHE5	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Add emergency preparedness and response information in local phone books.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #AME4	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Conduct “FireWise” workshops.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Virginia Department of Forestry, Emergency Services Coordinator
Estimated Cost:	$2000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant, General Revenue
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action # AMP2	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Continue to pursue conservation easements in sensitive areas.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Community Development Department - Planning
Estimated Cost:	Unknown: based on individual property assessments
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Other external sources
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # AHE3	
Community Name:	Albemarle
Category:	Outreach and Education
Action Item (Describe):	Create educational campaign about the benefits of open space protection.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development - Planning, County Executive's Office - Community Relations
Estimated Cost:	$2000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action # AHI1	
Community Name:	Albemarle
Category:	Information and Data Development
Action Item (Describe):	Conduct study of resistance of critical facilities to natural hazards
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development – Building Code and Inspections, Emergency Services Coordinator
Estimated Cost:	Staff time and resources; Red Cross provides technical assistance and design criteria
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action # AMP3	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Develop cooperative agreement between all agencies involved in emergency management, provide methods of communication between agencies responsible for being present at Emergency Communication Center following disaster, and conduct joint emergency exercises.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action # AHP2	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development - Planning
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action # AHP3	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Conduct Community Emergency Response Team (CERT) classes
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action # AHP4	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Increase number of trained emergency responders.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	As increased population warrants
Priority	High

Mitigation Action # AMP4	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Hire fire code official.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Emergency Services Coordinator, Board of Supervisors
Estimated Cost:	$70,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action # AHE4	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Provide educational information about the burn permit process.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Forestry, Department of Public Works, County Executive's Office – Community Relations
Estimated Cost:	Staff time and resources; additional costs possible
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action # AHP5	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support tree maintenance program
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	VDOT
Estimated Cost:	Staff time and resources; additional costs as needed
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action # AMS1	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Install backup generators in shelters and critical facilities
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$15,000/unit
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program, All Hazards Emergency Operations Planning, Emergency Management Performance Grants
Implementation Schedule:	As new shelters and critical facilities are built
Priority	Moderate

Mitigation Action # ALS1	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Improve the maintenance of stormwater conveyance systems.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Stormwater Management Program
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # AMS 2	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Build or repair bridges so as not to impede floodwaters.
Hazard (s):	Flood
Lead Agency/Department Responsible:	VDOT
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, 406 Public Assistance Program (Following a disaster)
Implementation Schedule:	When bridges are repaired or newly built
Priority	Moderate

Mitigation Action # ALS2	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Increase capacity of drainage systems and ponds where needed
Hazard (s):	Flood
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Stormwater Management Program, General Revenue
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action # ALS3	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Clear creek beds or dredge creeks to remove debris where flooding has increased
Hazard (s):	Flood
Lead Agency/Department Responsible:	Department of Public Works, Department of Forestry
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action # ALS4	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Reduce pollution discharge via stormwater systems
Hazard (s):	Flood
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Stormwater Management Programs
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # ALS5	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Retrofit stormwater management basins
Hazard (s):	Flood
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	Unknown; based on individual projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Stormwater Management Program
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # AMS3	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Upgrade all area bridges to support emergency vehicles
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Virginia Department of Transportation, CSX Railroad
Estimated Cost:	Unknown-based on individual projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program (following a disaster), Hazard Mitigation Grant Program
Implementation Schedule:	As repairs are made
Priority	Moderate

Mitigation Action # AHS1	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Ensure all shelters and public buildings have a battery-powered emergency radio and flashlight
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$40/location
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	1 year
Priority	High

Mitigation Action # ALS6	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Ensure evacuation routes meet proper standards
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Unknown; pending analysis
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hurricane Local Grant Program, 406 Public Assistance Program, Hazard Mitigation Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action # ALS7	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Encourage fire breaks in tree farms
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Virginia Department of Forestry, Emergency Services Coordinator
Estimated Cost:	Minimal
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # AME5	
Community Name:	Albemarle
Category:	Education and Outreach
Action Item (Describe):	Educate as to the benefits of clearing out dead wood from forests.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Emergency Services Coordinator to educate property owners
Estimated Cost:	$500
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Assistance to Firefighters Grant, General Revenue, volunteer services
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # ALP1	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Use recreational trails as fire breaks and access lines
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Virginia Department of Forestry, Emergency Services Coordinator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # ALS8	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Install more dry hydrants in high wildfire risk areas
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Virginia Department of Forestry, Emergency Services Coordinator
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia Dry Hydrant Grant Program
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action # ALS9	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Clear ditches of flammable debris.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Department of Public Works
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # ALS10	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Create defensible spaces between woodland home communities and areas of high wildfire risk.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Department of Forestry, Emergency Services Coordinator, Private Developers
Estimated Cost:	Unknown; based on individual communities
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant, Hazard Mitigation Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action # ALS11	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Move shrubs and landscaping away from homes, public buildings, and businesses, and clear dead brush and grass from properties in high wildfire risk areas.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Department of Public Works, Emergency Services Coordinator, Private Property Owners
Estimated Cost:	Staff time and resources; free educational information available from Red Cross, FEMA, and Forestry Department
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action # AHS2	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Conduct phase I improvement to Ragged Mountain Reservoir Dam—Add larger spillway and additional concrete reinforcement to spillway
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Emergency Services Coordinator, Rivanna Water and Sewer Authority
Estimated Cost:	$5,250,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept of Agriculture, National Resources Conservation Services), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	1-5 years
Priority	High

Mitigation Action # AHI2	
Community Name:	Albemarle
Category:	Information and Data Development
Action Item (Describe):	Complete water supply study
Hazard (s):	Drought
Lead Agency/Department Responsible:	Department of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action # AHP4	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Implement recommendations of water supply study
Hazard (s):	Drought
Lead Agency/Department Responsible:	Department of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	$120 million
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Based upon recommendations
Implementation Schedule:	50 years
Priority	High

Mitigation Action # ALP2	
Community Name:	Albemarle
Category:	Policy, Planning, and Funding
Action Item (Describe):	Acquire riparian easements in sensitive and/or flood prone areas
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	Dependent upon on number and size of easements
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	EPA Watershed Initiative Grant, USDA Natural Resources Conservation Service – Watershed Protection and Flood Prevention Program, EPA Chesapeake Bay Program
Implementation Schedule:	3+ years
Priority	Low

Mitigation Action # AMS4	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Complete phase II upgrades to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline
Hazard (s):	n Failure
Lead Agency/Department Responsible:	partment of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	$10,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, National Resources Conservation Service), Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action # AMS5	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations.
Hazard (s):	n Failure
Lead Agency/Department Responsible:	partment of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	$10,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, National Resources Conservation Services), Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action # AHI3	
Community Name:	Albemarle
Category:	Information and Data Development
Action Item (Describe):	Coordinate with Fluvanna County on emergency plan for failure of South Fork Rivanna Reservoir Dam
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Department of Community Development - Water Resources, Rivanna Water and Sewer Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action # AMI1	
Community Name:	Albemarle
Category:	Information and Data Development
Action Item (Describe):	Gather and maintain GIS database on bank restoration needs of Rivanna watershed
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development - Water Resources, Rivanna Water and Sewer Authority, The Nature Conservancy
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # ALS12	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Maintain and add more fire rings in camping areas for controlled fires.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Albemarle Recreation Department, Private Campground Owners, National Park Service
Estimated Cost:	$50,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Hazard Mitigation Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action # AMI2	
Community Name:	Albemarle
Category:	Information and Data Development
Action Item (Describe):	Expand GIS data for use in mitigation planning activities
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Department of Community Development – Planning, TJPDC
Estimated Cost:	$50,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program ,General Revenue, ESRI, Pre-Disaster Mitigation Grant, Department of the Interior – National Cooperative Geologic Mapping Program
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action # AHS3	
Community Name:	Albemarle
Category:	Structural
Action Item (Describe):	Conduct structural evaluations of all current and proposed shelters
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, Department of Community Development - Building Code and Inspections
Estimated Cost:	Staff time and resources; Red Cross provides technical assistance and design criteria
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action # ASMP1	
Community Name:	Albemarle – Town of Scottsville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action # ASLS1	
Community Name:	Albemarle – Town of Scottsville
Category:	Structural
Action Item (Describe):	Bury utilities underground in town of Scottsville
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, Department of Public Works
Estimated Cost:	$5,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	1-5 years
Priority	Low

Mitigation Action # CME1	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Encourage water conservation.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services/ Rivanna Water and Sewer Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action # CMP11	
Community Name:	Charlottesville
Category:	Planning, Policy, and Funding
Action Item (Describe):	Create a media strategy.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CMP2	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Create a public education program on disaster preparedness.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, TJPDC, Neighborhood Development Services
Estimated Cost:	$2,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, FEMA Community Assistance Performance Grants (SSE), Emergency Management Performance Grants
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CHE1	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Provide a telephone number or website that gives useful information following a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator; Neighborhood Development Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation, General Revenue
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #CHP1	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Provide training for building inspectors and code officials on mitigation techniques and hazard-resistant building.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services, Public Works
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #CLE3	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Provide lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC, Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #CHE2	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Place hazard mitigation plan in local libraries and on locality websites.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	Staff time and resources.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Upon full approval and adoption of plan
Priority	High

Mitigation Action #CME3	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Create displays about mitigation actions for use at public events.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator/Neighborhood Development Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #CMP1	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Create an Emergency Action Plan for the Upper Ragged Mountain Dam
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Emergency Management Coordinator
Estimated Cost:	$20,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept. of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept. of Agriculture, Natural Resources Conservation Service)
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action #CHE4	
Community Name:	Charlottesville
Category:	Education and Outreach
Action Item (Describe):	Add emergency preparedness and response information in local phone books.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #CHE3	
Community Name:	Charlottesville
Category:	Outreach and Education
Action Item (Describe):	Create educational campaign about the benefits of open space protection.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	$2000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #CHP2	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #CHP3	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Conduct Community Emergency Response Team (CERT) classes
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FEMA Community Emergency Response Teams, FEMA Emergency Management Performance Grant
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #CLS9	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Provide citizens with literature about flood and drought-smart landscaping.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services, Public Works
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #CLS1	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Improve the maintenance of stormwater conveyance systems.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Public Works
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Environmental Protection Agency-Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CMS1	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Build or repair bridges so as not to impede floodwaters.
Hazard (s):	Flood
Lead Agency/Department Responsible:	VDOT
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, 406 Public Assistance Program (Following a disaster)
Implementation Schedule:	When bridges are repaired or newly built
Priority	Moderate

Mitigation Action #CLS2	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Increase capacity of drainage systems and ponds where needed
Hazard (s):	Flood
Lead Agency/Department Responsible:	Public Works
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Environmental Protection Agency-Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #CLS3	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Clear creek beds or dredge creeks to remove debris where flooding has increased
Hazard (s):	Flood
Lead Agency/Department Responsible:	Public Works, Department of Forestry
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #CLS4	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Reduce pollution discharge via stormwater systems
Hazard (s):	Flood
Lead Agency/Department Responsible:	Public Works
Estimated Cost:	Unknown; based on need
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Environmental Protection Agency-Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CLS5	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Retrofit stormwater management basins
Hazard (s):	Flood
Lead Agency/Department Responsible:	Public Works
Estimated Cost:	Unknown; based on individual projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Environmental Protection Agency-Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CMS2	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Repair JPA bridge and others to support emergency vehicles
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Virginia Department of Transportation, CSX Railroad
Estimated Cost:	Unknown-based on individual projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program (following a disaster), Hazard Mitigation Grant Program
Implementation Schedule:	As repairs are made
Priority	Moderate

Mitigation Action #CHS1	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Ensure all shelters and public buildings have a battery-powered emergency radio and flashlight
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$40/location
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	1 year
Priority	High

Mitigation Action #CLS6	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Ensure evacuation routes meet proper standards
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Unknown; pending analysis
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hurricane Local Grant Program, 406 Public Assistance Program, Hazard Mitigation Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #CHS2	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Conduct phase I improvement to Ragged Mountain Reservoir Dam—Add larger spillway and additional concrete reinforcement to spillway
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Emergency Services Coordinator, Rivanna Water and Sewer Authority
Estimated Cost:	$5,250,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	1-5 years
Priority	High

Mitigation Action #CHI1	
Community Name:	Charlottesville
Category:	Information and Data Development
Action Item (Describe):	Complete water supply study
Hazard (s):	Drought
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action #CHP5	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Implement recommendations of water supply study
Hazard (s):	Drought
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority
Estimated Cost:	$120 million
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Based upon recommendations
Implementation Schedule:	50 years
Priority	High

Mitigation Action #CMS3	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Complete phase II upgrades to Ragged Mountain Reservoir which includes upgrading the Sugar Hollow pipeline
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority
Estimated Cost:	$10,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #CMS4	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Initiate phase II upgrades to Ragged Mountain Reservoir which includes upgrading the pump stations.
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority
Estimated Cost:	$10,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Flood Control Works/Emergency Rehabilitation Grant, National Dam Safety Program, River Basin Program (Dept of Agriculture, Natural Resources Conservation Service), Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #CMP3	
Community Name:	Charlottesville
Category:	Information and Data Development
Action Item (Describe):	Coordinate with Fluvanna County on emergency plan for failure of South Fork Rivanna Reservoir Dam
Hazard (s):	Dam Failure
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High
Mitigation Action #CHP10	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure that all public buildings have shelter in place plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #CHP9	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure that all public buildings have current evacuation plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #CLI4	
Community Name:	Charlottesville
Category:	Information and Data Development
Action Item (Describe):	Conduct channel improvement study to investigate flooding problems.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services, Public Works
Estimated Cost:	$25,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, Watershed Protection and Flood Prevention Program(Dept of Agriculture, Natural Resources Conservation Service)
Implementation Schedule:	
Priority	

Mitigation Action #CLP2	
Community Name:	Charlottesville
Category:	
Action Item (Describe):	Join the Community Rating System to lower flood risk and insurance rates.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	$12,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #CMP12	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Pursue conservation easements in sensitive areas.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation, Hazard Mitigation Grant Program, EPA Chesapeake Bay Program
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CLP3	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support open space preservation in floodplains.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CMP6	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Require more stringent policy to discourage floodplain development.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-4 years
Priority	Moderate

Mitigation Action #CLP4	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Hire a floodplain management official and enforce floodplain regulations.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	$70,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, General Revenue
Implementation Schedule:	3-5 year
Priority	Low

Mitigation Action #CMP7	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Prevent clear cutting or removal of forested area to prevent mudslides.
Hazard (s):	Landslide
Lead Agency/Department Responsible:	Neighborhood Development Services, Public Works
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CHP8	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Continue use of the Reverse E911 system.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #CMP4	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support volunteer groups and encourage collaboration on public outreach and education.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	All City Departments, Emergency Services Coordinator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CHP6	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Provide rebate to homeowners who purchase low-flow appliances.
Hazard (s):	Drought
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	$100/appliance
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Hazard Mitigation Grant Program, Pre Disaster Mitigation Grant
Implementation Schedule:	Ongoing; pending available funding
Priority	High

Mitigation Action #CHP7	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Encourage more institutions to use low-flow appliances.
Hazard (s):	Drought
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #CMP5	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Establish plan for municipal operations prior to and during droughts.
Hazard (s):	Drought
Lead Agency/Department Responsible:	Public Works
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #CMS6	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Add signage to roads in locations that frequently flood.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Virginia Department of Transportation, Public Works
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program (following a disaster), Hurricane Local Grant Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #CLS7	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Remove abandoned buildings in floodplain.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #CMS5	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Put high water marks on bridges.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Virginia Department of Transportation, Public Works
Estimated Cost:	$15,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program (following a disaster), Hurricane Local Grant Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #CMP9	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Develop water restriction policy during drought.
Hazard (s):	Drought
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #CMI1	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Gather and maintain GIS database on bank restoration of Rivanna River
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services, Rivanna Water and Sewer Authority, The Nature Conservancy
Estimated Cost:	$27,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	
Implementation Schedule:	1-2 years
Priority	Moderate

Mitigation Action #CMP8	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support purchase of rain barrels.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	1 year
Priority	Moderate

Mitigation Action #CLP7	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Preserve riparian buffers.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	EPA- Chesapeake Bay Act, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service)
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CMS7	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Retrofit emergency service buildings for hazard resistance.
Hazard (s):	Structural
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	All Hazards Emergency Operations Planning, Assistance to Local Firefighters Grant, Local Hurricane Grant Program, Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program
Implementation Schedule:	Moderate
Priority	3-5 years

Mitigation Action #CLS8	
Community Name:	Charlottesville
Category:	Structural
Action Item (Describe):	Bury power, phone, and cable utility lines underground.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Local companies
Estimated Cost:	$5,000,000, Public Works
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	5+years
Priority	Low

Mitigation Action #CLP6	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Encourage creek and stream storage capacity through daylighting.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	EPA-Chesapeake Bay Program, Hazard Mitigation Grant Program, Watershed Protection and Flood Prevention (Dept of Agriculture, Natural Resources Conservation Service)
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #CLP5	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Install back-flow valves to prevent reverse flow for new construction.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #CMP10	
Community Name:	Charlottesville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Encourage policy which implements proactive environmental actions to reduce flooding—reduce impervious surfaces, restore wetlands, restore streambanks, add curb extensions to catch leaf debris.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Neighborhood Development Services
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #FHS1	
Community Name:	Fluvanna
Category:	Structural
Action Item (Describe):	Retrofit emergency service buildings for hazard resistance.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	County Administrator
Estimated Cost:	$5,000-40,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	1-5 Years
Priority	High

Mitigation Action #FHS2	
Community Name:	Fluvanna
Category:	Structural
Action Item (Describe):	Install backup generators in shelters and critical facilities.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	County Administrator
Estimated Cost:	$5,000-$15,000/generator
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, All Hazards Emergency Operations Planning Grant
Implementation Schedule:	1-5 Years
Priority	High

Mitigation Action #FHP1	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Conduct structural evaluations and study of resistance to hazards of all current and proposed shelters.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	County Administrator
Estimated Cost:	Staff time and resources; Red Cross provides technical assistance and design criteria
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 Years
Priority	High

Mitigation Action #FHE1	
Community Name:	Fluvanna
Category:	Education and Outreach
Action Item (Describe):	Provide telephone number and website with useful information before and during a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Safety, TJPDC, phone company
Estimated Cost:	Minimal staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #FLP1	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Increase number of trained citizen emergency responders, conduct CERT workshop.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Safety
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FEMA All Hazards Emergency Operations Grant, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, General Revenue
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #FLE1	
Community Name:	Fluvanna
Category:	Education and Outreach
Action Item (Describe):	Provide educational lectures about mitigation to homeowner groups, Ruritan clubs, and other organizations.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Safety
Estimated Cost:	Staff time and resources; free material from FEMA and Red Cross
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #FLE2	
Community Name:	Fluvanna
Category:	Education and Outreach
Action Item (Describe):	Develop an all-hazard resource center at libraries or other public office.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Safety, TJPDC
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #FHI1	
Community Name:	Fluvanna
Category:	Information/ Data Development
Action Item (Describe):	Update National Flood Insurance Program Maps.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning Department, TJPDC, DCR
Estimated Cost:	$50,000-75,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Cooperative Technical Partnership Grant
Implementation Schedule:	1-3 Years
Priority	High

Mitigation Action #FMP1	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Create a community toolbox with tools and information for local homeowners.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #FMP2	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Develop water restriction policy during drought
Hazard (s):	Drought
Lead Agency/Department Responsible:	County Administrator/Public Works
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #FMP3	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Following plan adoption
Priority	Moderate

Mitigation Action #FLL1	
Community Name:	Fluvanna
Category:	Policy, Planning, and Funding
Action Item (Describe):	Encourage proactive stormwater mitigation measures such as flood projects, reducing impervious surfaces, stilling and infiltration basins, and restoring wetlands in growth areas.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning Department, County Administrator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #FCHE1	
Community Name:	Fluvanna – Town of Columbia
Category:	Education and Outreach
Action Item (Describe):	Provide telephone number and website with useful information before and during a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Safety, TJPDC, phone company
Estimated Cost:	Minimal staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #FCMP1	
Community Name:	Fluvanna – Town of Columbia
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #GHP1	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Establish Reverse E-911 System
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services and Communications, Sprint
Estimated Cost:	$41,108 to install $14,500 per year to maintain
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FEMA All Hazards Emergency Operations Planning, Pre-Disaster Mitigation, Hurricane Local Grant Program, Assistance to Firefighters Grant
Implementation Schedule:	1 year
Priority	High

Mitigation Action #GHP3	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Update driveway codes to allow access for emergency vehicles.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	None / Staff time
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #GHI1	
Community Name:	Greene
Category:	Information/Data Development
Action Item (Describe):	Update FEMA Floodplain maps
Hazard (s):	Flood
Lead Agency/Department Responsible:	DCR, FEMA, consultant
Estimated Cost:	$50,000-$75,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Cooperative Technical Partners Grant
Implementation Schedule:	1-5 years
Priority	High

Mitigation Action # GHP4	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Routinely inspect fire hydrants.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Fire Department
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #GLP3	
Community Name:	Greene
Category:	Policy, Planning and Funding
Action Item (Describe):	Provide paid fire and rescue staff.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #GHS1	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Install back up electrical generators in critical facilities.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services, Facility Operator
Estimated Cost:	$5,000-$25,000 per unit
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program, FEMA All Hazards Emergency Operations Planning Grant
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #GLS2	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Ensure culverts, streams, channels, storm drains, and gutters remain clear of debris.
Hazard (s):	Flood
Lead Agency/Department Responsible:	VDOT, Public Works
Estimated Cost:	Minimal – staff time & labor
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, EPA Chesapeake Bay Act
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #GMS2	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Build and repair bridges so as not to impede floodwaters.
Hazard (s):	Flood
Lead Agency/Department Responsible:	VDOT, Public Works
Estimated Cost:	Dependent upon number and type of structures.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	VDOT primary road funds, County secondary road funds, 406 Public Assistance Program (following a disaster), Hurricane Local Grant Program
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GLS1	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Increase storage capacity of creeks and streams
Hazard (s):	Flood
Lead Agency/Department Responsible:	Army Corps of Engineers, Planning
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	EPA Chesapeake Bay Act, Watershed Protection and Flood Prevention Program (Department of Agriculture, Natural Resources Conservation Service)
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #GHE2	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Provide training for building officials and code inspectors
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Building services
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	1 year
Priority	High

Mitigation Action #GMI2	
Community Name:	Greene
Category:	Information/Data Development
Action Item (Describe):	Conduct channel improvement study
Hazard (s):	Floods
Lead Agency/Department Responsible:	Army Corps of Engineers
Estimated Cost:	$20,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	External Sources
Implementation Schedule:	Watershed Protection and Flood Prevention Program (Department of Agriculture, National Resource Conservation Service)
Priority	Moderate

Mitigation Action #GMP5	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Join the Community Rating System
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	$12,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GMI3	
Community Name:	Greene
Category:	Information/Data Development
Action Item (Describe):	Create needs survey identifying special populations.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	$3000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, General Revenue, All-Hazards Emergency Operations Planning
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action #GMP7	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Require more stringent policy to discourage floodplain development.
Hazard (s):	Floods
Lead Agency/Department Responsible:	Planning
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	In next comprehensive plan, zoning code, and subdivision code updates.
Priority	Moderate

Mitigation Action #GMP1	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support open space preservation in floodplain.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning and Administration
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #GMI1	
Community Name:	Greene
Category:	Information/Data Development
Action Item (Describe):	Standardize GIS data for use in mitigation planning
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department or GIS consultant
Estimated Cost:	$50,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue, ESRI Grants
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GHI2	
Community Name:	Greene
Category:	Information/Data Development
Action Item (Describe):	Conduct structural evaluations of current and proposed shelters.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Building Services, Emergency Services
Estimated Cost:	Staff time and resources; Red Cross provides technical assistance and design criteria
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #GHP2	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure all critical facilities have updated shelter-in-place plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Building Services, Emergency Services, Planning
Estimated Cost:	Minimal / Staff Time
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #GME2	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Develop cooperative agreements among agencies involved in emergency management.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	None – Staff time
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #GMP3	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	In next comprehensive plan update
Priority	Moderate

Mitigation Action #GMP6	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Conduct Citizen Emergency Response Team (CERT) classes
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, All Hazards Emergency Operations Planning, Pre-Disaster Mitigation Grant
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action #GLE1	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Encourage residents and agencies to clear storm drain inlets, ditches, and channels.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning, Public Works
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Low

Mitigation Action #GHE1	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Support volunteer groups and encourage collaboration on public outreach and education.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services, Virginia Department of Emergency Management, Red Cross
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #GHE3	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Place hazard mitigation plan in local libraries and websites.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Upon plan approval and adoption
Priority	High

Mitigation Action #GME1	
Community Name:	Greene
Category:	Education and Outreach
Action Item (Describe):	Develop all hazard resource center.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services, Planning, TJPDC
Estimated Cost:	$1,000-$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, General Revenue
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GLP1	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Investigate safety and maintenance of roads in private communities.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Public Works, Emergency Management
Estimated Cost:	Staff Time and Resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GLP2	
Community Name:	Greene
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure primary roads are clear of trees and power lines to the edge of the right of way.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	VDOT, Public Works, Emergency Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Primary Road funds, 406 Public Assistance Program (following a disaster), Hurricane Local Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #GLS3	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Increase cell phone coverage in rural areas
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning, Cellular companies
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	Low

Mitigation Action #GMS1	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Retrofit emergency services building for hazard resistance.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services, Building Services, Engineer
Estimated Cost:	Dependent upon evaluation
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation, All Hazard Emergency Operation Planning Grant, Hazard Mitigation Grant Program
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GMP2	
Community Name:	Greene
Category:	Policy, Planning and Funding
Action Item (Describe):	Ensure evacuation routes are upgraded to proper standards
Hazard (s):	Multiple
Lead Agency/Department Responsible:	VDOT, Planning
Estimated Cost:	Cost determined after evaluation
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program, Hazard Mitigation Grant Program
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #GMP4	
Community Name:	Greene
Category:	Policy, planning, and funding
Action Item (Describe):	Preserve riparian buffers
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning, Agricultural Extension Service, TJSWCD
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #GLS4	
Community Name:	Greene
Category:	Structural
Action Item (Describe):	Create defensible space between Woodland Home Communities and areas of high wildfire risk
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Planning, Department of Forestry, Fire Department
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FireWise Virginia Grant
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #GSHP1	
Community Name:	Greene – Town of Stanardsville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Establish Reverse E-911 System
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services and Communications, Sprint
Estimated Cost:	$41,108 to install $14,500 per year to maintain
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FEMA All Hazards Emergency Operations Planning, Pre-Disaster Mitigation, Hurricane Local Grant Program, Assistance to Firefighters Grant
Implementation Schedule:	1 year
Priority	High

Mitigation Action #GSMP2	
Community Name:	Greene – Town of Stanardsville
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #GSLS1	
Community Name:	Greene – Town of Stanardsville
Category:	Structural
Action Item (Describe):	Bury utilities in Town of Stanardsville and surrounding area
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning, VDOT, utility companies
Estimated Cost:	$5,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Transportation Enhancement grants, Hazard Mitigation Grant Program, All Hazards Emergency Operations Planning, Hurricane Local Grant Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LHE1	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Encourage water conservation
Hazard (s):	Drought
Lead Agency/Department Responsible:	Water Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #LME1	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Create a public education program on how to be self-sufficient following a disaster and on mobilization
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #LHE2	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Provide a telephone number or website with useful information during a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action #LHE1	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Encourage water conservation
Hazard (s):	Drought
Lead Agency/Department Responsible:	Water Authority
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #LME1	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Create a public education program on how to be self-sufficient following a disaster and on mobilization
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #LHE2	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Provide a telephone number or website with useful information during a disaster.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action #LHE2	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Provide training for building inspectors and code officials
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$2,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #LHE4	
Community Name:	Louisa
Category:	Education and Outreach
Action Item (Describe):	Place hazard mitigation plan in local libraries and on locality website
Hazard (s):	Multiple
Lead Agency/Department Responsible:	TJPDC, Planning Department
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Upon plan adoption
Priority	High

Mitigation Action #LMI1	
Community Name:	Louisa
Category:	Information and Data Development
Action Item (Describe):	Identify long-term water needs and investigate potential of increased water supply
Hazard (s):	Drought
Lead Agency/Department Responsible:	Water Authority
Estimated Cost:	Based on depth of investigation
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #LLI1	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Providing stilling basins to capture stormwater and return to groundwater system on public property; encourage private property owners to take similar measures
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Dependent on number and size of projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation, Hazard Mitigation Grant Program, Chesapeake Bay Act
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LMI2	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Support open space preservation in floodplains.
Hazard (s):	Floods
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	Moderate

Mitigation Action #LMP1	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Create a needs survey that identifies special needs homes or facilities in need of attention in case of emergencies or evacuations.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Pre-Disaster Mitigation Grant, Hazard Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #LHP1	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Establish and maintain Reverse E911 system.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$40,000 to install, $15,000/year to maintain
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, Pre-Disaster Mitigation, FEMA All Hazards Emergency Operations Planning, Hurricane Local Grant Program, Assistance to Firefighters Grant, General Revenue
Implementation Schedule:	1-3 Years
Priority	High

Mitigation Action #LLP1	
Community Name:	Louisa
Category:	Information and Data Development
Action Item (Describe):	Track and map space available for pets at local SPCA and other animal shelters.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department, EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Low

Mitigation Action #LHP2	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure that all large facilities have updated evacuation plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action #LHP3	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Ensure that all large facilities have updated shelter-in-place plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1 year
Priority	High

Mitigation Action #LMP3	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Following plan adoption
Priority	Moderate

Mitigation Action #LLP2	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Develop driveway codes to allow emergency vehicle access.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Low

Mitigation Action #LHP3	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Conduct Community Emergency Response Team (CERT) classes
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$2,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program
Implementation Schedule:	Yearly
Priority	High

Mitigation Action #LHP5	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Increase number of trained citizen emergency responders
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMT
Estimated Cost:	$5,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #LMP4	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate special needs populations into Mitigation and Emergency Operations Plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action #LLP3	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Investigate safety and maintenance of roads in private communities.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LLP4	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Adopt state fire codes and hire fire code officer
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$70,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LMP5	
Community Name:	Louisa
Category:	Outreach and Education
Action Item (Describe):	Provide more education about the burn permit process.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	EMS, Virginia Department of Forestry
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #LLP5	
Community Name:	Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Develop more stringent building and landscaping codes to prevent forest fires.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LHS1	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Install backup generators in shelters and critical facilities
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$15,000/generator
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, FEMA All Hazards Emergency Operations Planning
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #LHS2	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Put high water marks on bridges
Hazard (s):	Flood
Lead Agency/Department Responsible:	EMS, VDOT
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #LMS1	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Add signage to roads in locations that frequently flood.
Hazard (s):	Flood
Lead Agency/Department Responsible:	EMS, VDOT
Estimated Cost:	$10,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	406 Public Assistance Program (following a disaster), Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant, All Hazards Emergency Operations Planning Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #LLP6	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Reduce pollution discharge via stormwater systems
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	Dependent upon number and scope of projects.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	EPA Watershed Initiatives Grant, USDA Natural Resources Conservation Service – Watershed Protection and Flood Prevention Program, EPA Chesapeake Bay Program
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LMS2	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Increase cell phone coverage in rural areas
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS, Cellular Service Providers
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #LHS3	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Ensure all shelters and public buildings have a battery-powered emergency radio and flashlight
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	$50/shelter
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #LHS4	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Ensure all houses have properly placed 911 address signs
Hazard (s):	Multiple
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #LMS1	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Install more dry hydrants
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	EMS
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant, Hazard Mitigation Grant Program, Pre Disaster Mitigation Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #LLS1	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Create more defensible space between woodland communities and areas of high wildfire risk.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	EMS, Virginia Department of Forestry
Estimated Cost:	Based on number and types of projects
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Virginia FireWise Grant, Assistance to Local Firefighters Grant, Hazard Mitigation Grant Program, Pre Disaster Mitigation Grant
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #LMP2	
Community Name:	Louisa
Category:	Structural
Action Item (Describe):	Update FEMA National Flood Insurance Program Maps
Hazard (s):	Flood
Lead Agency/Department Responsible:	TJPDC, Planning Department
Estimated Cost:	$50-75,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Cooperative Technical Partnership Grant
Implementation Schedule:	1-3 years
Priority	Moderate

Mitigation Action #LLMP1	
Community Name:	Louisa – Town of Louisa
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #LLLS1	
Community Name:	Louisa – Town of Louisa
Category:	Structural
Action Item (Describe):	Bury utilities underground in town of Louisa
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, Department of Public Works
Estimated Cost:	$5,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	1-5 years
Priority	Low

Mitigation Action # LMMP1	
Community Name:	Louisa – Town of Mineral
Category:	Policy, Planning, and Funding
Action Item (Describe):	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #LMLS1	
Community Name:	Louisa – Town of Mineral
Category:	Structural
Action Item (Describe):	Bury utilities underground in town of Mineral
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator, Department of Public Works
Estimated Cost:	$5,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant
Implementation Schedule:	1-5 years
Priority	Low

Mitigation Action #NHS1	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Upgrade communication system.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	Over $3,000,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue, All Hazard Emergency Operations Planning 406 Public Assistance Program (following a declared disaster)
Implementation Schedule:	When funding is secured
Priority	High

Mitigation Action #NHS2	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Install generators at all emergency shelters
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	$15,000/generator
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Hazard Mitigation Grant Program, All Hazard Emergency Operations Planning, Hurricane Local Grant Program, General Revenue
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #NHS3	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Ensure that all houses have properly placed, current 911 street addresses.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	Staff time and resources
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FireWise Virginia Grant
Implementation Schedule:	1-3 years
Priority	High

Mitigation Action #NHS4	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Install drone sirens at each fire and rescue station.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	All Hazards Emergency Operations Planning Grant, Hurricane Local Grants Program, Hazard Mitigation Grant Program
Implementation Schedule:	3-5 years
Priority	High

Mitigation Action #NHP2	
Community Name:	Nelson
Category:	Policy, Planning, and Funding
Action Item (Describe):	Complete installation of Reverse E-911 System
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services Coordinator
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	General Revenue
Implementation Schedule:	1-2 years
Priority	High

Mitigation Action #NHP1	
Community Name:	Nelson
Category:	Policy, Planning and Funding
Action Item (Describe):	Encourage residents to build and maintain private driveways adequate for emergency vehicles
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	Ongoing
Priority	High

Mitigation Action #NMS1	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Investigate potential to elevate or otherwise protect roads from flooding: Rt. 617, 29 at Nelson County High School, Knuckle Run, Colleen by Woodland Church, Rt. 56 at Tye River, Rt. 632 at Rockfish River, Johnson Hollow
Hazard (s):	Flood
Lead Agency/Department Responsible:	VDOT
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	VDOT Primary and Secondary Road Funds, 406 Public Assistance Program (following declared disaster), Hazard Mitigation Grant Program
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #NMI1	
Community Name:	Nelson
Category:	Information/Data Development
Action Item (Describe):	Update FEMA floodplain maps
Hazard (s):	Flood
Lead Agency/Department Responsible:	Planning Department, TJPDC, Emergency Services
Estimated Cost:	$50,000-$75,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Cooperative Technical Partnership Grant
Implementation Schedule:	2-5 years
Priority	Moderate

Mitigation Action #NME1	
Community Name:	Nelson
Category:	Education and Outreach
Action Item (Describe):	Conduct FireWise workshops.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Emergency Services
Estimated Cost:	$200
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FireWise Virginia Grant
Implementation Schedule:	1-5 years
Priority	Moderate

Mitigation Action #NMS2	
Community Name:	Nelson
Category:	Structural
Action Item (Describe):	Create defensible space between areas of high wildfire risk and woodland home communities.
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Department of Forestry
Estimated Cost:	Unknown
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	FireWise Virginia Grant
Implementation Schedule:	3-5 years
Priority	Moderate

Mitigation Action #NLP1	
Community Name:	Nelson
Category:	Policy, Planning, and Funding
Action Item (Describe):	Strengthen policy to prohibit development in or near floodplains.
Hazard (s):	Flood
Lead Agency/Department Responsible:	Board of Supervisors, Planning Department
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #NLP2	
Community Name:	Nelson
Category:	Policy, Planning, and Funding
Action Item (Describe):	Join the Community Rating System
Hazard (s):	Flood
Lead Agency/Department Responsible:	Emergency Services, Planning Department, TJPDC
Estimated Cost:	$12,000
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Flood Mitigation Assistance Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation
Implementation Schedule:	5+ years
Priority	Low

Mitigation Action #NLP3	
Community Name:	Nelson
Category:	Policy, Planning, and Funding
Action Item (Describe):	Strengthen building codes to protect homes from wildfires
Hazard (s):	Wildfire
Lead Agency/Department Responsible:	Planning Department
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	3-5 years
Priority	Low

Mitigation Action #NLP4	
Community Name:	Nelson
Category:	Policy, Planning and Funding
Action Item (Describe):	Develop cooperative agreement with surrounding jurisdictions and institutions of higher education to improve communications.
Hazard (s):	Multiple
Lead Agency/Department Responsible:	Emergency Services, County Administrator
Estimated Cost:	None
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	N/A
Implementation Schedule:	2-3 years
Priority	Low

Plan Maintenance

201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five year cycle.

This section describes the process for participating jurisdictions to implement the mitigation strategies and for evaluating and enhancing the overall hazard mitigation plan over time. This section also describes continued public involvement in the hazard mitigation planning process.

The long-term success of the TJPDC hazard mitigation plan depends in large part upon routine monitoring, evaluating, and updating of the plan so that it will remain a valid tool for the community. The Hazard Mitigation Working Group, supported by TJPDC staff, will implement plan maintenance activities. The Working Group has guided the planning process through initial plan development and consists of at least one planner from each locality and the emergency manager or county administrator from each locality.

The Working Group will monitor the efficiency and effectiveness of the mitigation strategies and will make recommendations for additional improvements. The evaluation will address whether:

1. goals and objectives address current and expected conditions;
2. the nature, magnitude, or type of hazard affecting the region has changed;
3. current resources are appropriate for implementing the plan
4. important problems such as technical, political, legal, or coordination issues with other agencies have occurred;
5. agencies and other partners are participating as originally proposed.

The Working Group will meet annually in May to review the year's local hazard events and impacts, community actions that may help or hinder mitigation capabilities, and the progress of mitigation activities.

Each locality will submit an annual report to the Thomas Jefferson Planning District Commission, one month prior to the Annual Meeting of the Working Group. The local report will include an analysis of progress on the mitigation strategies identified in the Plan, as well as any other projects or activities that contribute to progress toward the goals in the plan. The Working Group, supported by TJPDC staff, will compile information from the local annual reports and the analysis of hazard events, impacts, community actions, and information on the latest legislative requirements and/or changes into an Annual Report, which will be made available to each jurisdiction's Board of Supervisors or City Council, the Virginia Department of Emergency Management, the Advisory Committee and the public.

Implementation

Each jurisdiction participating in this Plan is responsible for implementing specific mitigation actions as prescribed in their locally adopted Mitigation Action Plan. In the Mitigation Action Plan, each proposed action is assigned to a specific local department or agency in order to increase accountability and likelihood of implementation. This approach enables individual jurisdictions to update their unique mitigation strategy as needed without altering the broader focus of the TJPDC plan elements. The separate adoption of locally specific actions also ensures that each jurisdiction is not held responsible for the actions of every other jurisdiction involved in the planning process. In addition to the specific local department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. The TJPDC and its jurisdictions will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. Whenever possible, a funding source has been identified for proposed actions listed in the Mitigation Action Plan.

Each participating jurisdiction has as an action item the incorporation of the Hazard Mitigation Plan into community plans. This includes the jurisdiction's Comprehensive Plan and other plans, such as the Emergency Response Plan and/or the Capital Improvement Plan (CIP), as appropriate. Responsibility for plan inclusion into Comprehensive Plans and CIPs will rest upon the jurisdictions' planning departments, planning commissions, Boards of Supervisors and City/Town Councils; for those actions relating to Emergency Response Plans, the Local Emergency Planning Committees will be responsible.

Evaluation and Enhancement

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals and objectives of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable Federal regulations or state statutes. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to each jurisdiction's individual mitigation strategy.

Five Year Plan Review

The Plan will undergo a comprehensive review and evaluation process every 5 years by the Working Group and the TJPDC under the authority of the Board of Supervisors or City Council of each locality to determine whether there have been any significant changes necessitating changes in the type of mitigation actions proposed. Factors that may affect the content of the Plan include, but are not limited to: new development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation. The first update will be due for review and re-approval by the state and FEMA on or before August 1, 2010. This review also provides community officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures.

In addition to the FEMA-required 5-year review, the Advisory Committee and TJPDC will continue to meet annually and after major events occur. This will ensure that the plan is continuously updated to reflect changing conditions within the region.

Disaster Declaration

Following a disaster, the Plan may need to be revised to reflect lessons learned, or to address specific circumstances arising from the event.

Reporting Procedures

The Working Group will issue an Annual Report, including an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Changes to the Plan will be assigned to appropriate local officials with pre-determined timelines for completion. If changes are required to individual Mitigation Action Plans, the appropriate local designee will assign responsibility for the completion of the task.

Plan Amendment Process

Upon the initiation of the amendment process, the TJPDC and all localities will forward information on the proposed changes to all interested parties including, but not limited to, all affected county and City departments, residents, and businesses and the Advisory Committee. Information will also be forwarded to VDEM. This information will be disseminated in order to seek input on the proposed amendments for not less than a 45-day review and comment period. At least one public hearing will be scheduled with the Advisory Committee and the public within the pubic comment period. If no comments are received from the reviewing parties within the specified review period, such will be noted accordingly.

At the end of the 45-day review and comment period, the proposed amendment and all comments will be forwarded to the Working Group for consideration. The Working Group will review the proposed amendment along with the comments received at the public hearing or from other parties, and submit a recommendation to the Boards of Supervisors within 60 days.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered:

- There were errors or omissions made in the identification of issues or needs during the preparation of the Plan;
- New issues or needs have been identified which were not adequately addressed in the Plan;
- There has been a change in information, data, or assumptions from those on which the Plan was based.

Upon receiving the recommendation of the designee, the Boards of Supervisors and City Council will hold a public hearing. The Board of Supervisors will review the recommendation (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the Board of Supervisors will take one of the following actions:

- Adopt the proposed amendment as presented
- Adopt the proposed amendment with modifications
- Refer the amendment request back to the designee for further consideration; or
- Defer the amendment request for further consideration and/or hearing.

Continued Public Involvement

Public input was an integral part of the completion of this Plan and will continue to be essential as this Plan changes over time. As is the case with any officially adopted plan or ordinance, significant changes to this Plan shall require a public hearing.
Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place;
- Utilizing TJPDC and City and County web sites to advertise any maintenance and/or periodic review activities taking place and to post the Annual Report;
- Keeping copies of the plan and Annual Reports in public libraries; and
- Convening an annual meeting of the Advisory Committee to present the Annual Report.

Regional Hazard Mitigation Plan

Appendix A

Correspondence, Reports and Minutes

Prepared by:
Thomas Jefferson
Planning District Commission

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Regional Hazard Mitigation Plan

Appendix B

Plan Summaries

Prepared by:
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